City of Arcadia

Urban Water Management Plan

2010 Update

June 2011

City of Arcadia
Public Works Services Department
P.O. Box 60021
Arcadia, CA 91066-6021

CITY OF ARCADIA

URBAN WATER MANAGEMENT PLAN

2010 UPDATE

WATER UTILITY INFORMATION

City of Arcadia
Public Works Services Department
P. O. Box 60021
Arcadia, CA 91066-6021

CONTACT INFORMATION

Ken Herman
City of Arcadia
Deputy Public Works Service Director
(626) 256-6654
(626) 359-7028 (fax)
kherman@ci.arcadia.ca.us

The Water supplier is a: Municipality
Utility services provided by the water supplier include: Water
This Agency is not a Bureau of Reclamation Contractor.
This Agency is not a State Water Project Contractor.

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Chapter 1
PLAN PREPARATION

1.1 BACKGROUND

Section 10617. "Urban Water Supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers.

Section 10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.
(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

The City of Arcadia is a water supplier and is required to prepare an Urban Water Management Plan (Plan) in accordance with the California Urban Water Management Planning Act (Act)[1] which was established in 1983. The Act requires every "urban water supplier" to prepare and adopt a Plan, periodically review its Plan at least once every five years and make any amendments or changes which are indicated by the review. An "Urban Water Supplier" is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000

[1] Water Code Sections 10610 through 10656

customers or supplying more than 3,000 acre-feet of water annually. The primary objective of the Act is to direct urban water suppliers to evaluate their existing water conservation efforts and, to the extent practicable, review and implement alternative and supplemental water conservation measures. The Act is directed primarily at retail water purveyors where programs can be immediately affected upon the consumer**.** The Act, originally known as Assembly Bill (AB) 797, is included in Appendix A.

In compliance with the Act, the City last updated the City of Arcadia Urban Water Management Plan in 2005. There have been many new amendments added to the City's Plan and some reorganization of the California Water Code sections since the City's last update. The following is a list of new requirements which were incorporated in the Plan:

- Senate Bill (SB) 1087 – Requires the City to report water use projections for lower income households within the City.
- AB 1376 – Requires the City to provide a 60 day notice, prior to a public hearing, to any City or County within which the City provides water supplies notifying that the City is reviewing the Plan and is considering changes.
- AB 1420 – Requires the City to verify compliance of Demand Management Measures (See Chapter 6) in order to qualify for water management grants or loans.
- SBX7-7 – Requires the City to reduce the City's per capita water use by 20 percent by 2020 (see Appendix B)

Section 10621(a) of the California Water Code states, "Each water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero." However, due to recent changes in Urban Water Management Plan requirements, California State law has extended the deadline for the 2010 Plans to July 1, 2011. The City's 2010 Plan is an update to the City's 2005 Plan.

1.2 COORDINATION

1.2.1 COORDINATION WITH APPROPRIATE AGENCIES

Section 10620.

(d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

Section 10621

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any City or County within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any City or County that receives notices pursuant to this subdivision.

The City of Arcadia is a retail water supplier that serves the majority of the residents within the City of Arcadia. The City is required to coordinate the preparation of the Plan with appropriate agencies in the area, including appropriate water suppliers that share a common source. Therefore, the City coordinated the preparation of the Urban Water Management Plan with the Raymond Basin Management Board, the County of Los Angeles, the Main San Gabriel Basin Watermaster (Main Basin Watermaster), the Upper San Gabriel Valley Municipal Water District (Upper District), the San Gabriel Valley Water Company, the City of Sierra Madre, the City of Pasadena Water and Power, Golden State Water Company, East Pasadena Water Company, Sunny Slope Water Company, the City of Monrovia and Arcadia residents (see Table 1). The City notified these agencies and Arcadia residents at least sixty (60) days prior to the public hearing of the preparation of the 2010 Plan and invited them to participate in the development of the Plan. A copy of the notification letters sent to these agencies is located in Appendix C. Table 1 indicates whether comments were provided to the City regarding preparation of the 2010 Plan.

1.2.2 NOTICE OF PUBLIC HEARING

Section 10642
Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any City or County within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

The City of Arcadia encouraged the active involvement of the population within its service area prior to and during the preparation of the Plan. Pursuant to Section 6066 of the Government Code, the City published a notice of public hearing in the newspaper during the weeks of June 6, 2011 and June 13, 2011. A notice of public hearing was also provided to the City Clerk's office and was posted throughout the City of Arcadia and on the City's website. Additionally, a notice of public hearing was sent the Raymond Basin Management Board, the County of Los Angeles, Main Basin Watermaster, Upper District, San Gabriel Valley Water Company, the City of Sierra Madre, the City of Pasadena Water and Power, Golden State Water Company, East Pasadena Water Company, Sunny Slope Water Company, and the City of Monrovia. To ensure that the plan was available for review, the City placed a copy of the 2010 draft Plan at the City Clerk's Office located at City Hall and made a copy available for review on its website. Copies of the notice of the public hearing are provided in Appendix D.

1.2.3 PUBLIC PARTICIPATION

Section 10642
Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the

Government Code. The urban water supplier shall provide notice of the time and place of hearing to any City or County within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

Pursuant to Section 6066 of the Government Code, the City published a notice of public hearing in the newspaper during the week of June 6, 2011 and June 13, 2011 indicating that the City would hold a public hearing to hear public comments and consider adoption of the draft 2010 Plan on June 21, 2011, as shown in Appendix D. In the same newspaper notice, the City indicated the draft 2010 Plan update was available for public review at the City Clerk's Office located at City Hall and on the City's website. The notice of public hearing was published and distributed to allow involvement of social, cultural and economic community groups. A copy of the notice of the public hearing is provided in Appendix D. The City also provided a notice of the public hearing to the Raymond Basin Management Board, the County of Los Angeles, the Main Basin Watermaster, the Upper District, the San Gabriel Valley Water Company, the City of Sierra Madre, the City of Pasadena Water and Power, Golden State Water Company, East Pasadena Water Company, the Sunny Slope Water Company and the City of Monrovia, as shown in Appendix D.

1.3 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

1.3.1 SUBMITTAL OF AMENDED PLAN

Section 10621

c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

If the Department of Water Resources (DWR) requires significant changes to the Plan before it determines the Plan to be "complete," the City will submit an amendment or a revised Plan. The amendment or revised Plan will undergo adoption by the City's governing board prior to submittal to DWR.

1.3.2 PLAN ADOPTION

Section 10642
After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

The City held a public hearing on June 21, 2011. Following the public hearing, the City adopted the draft Plan as its Plan. A copy of the resolution adopting the Plan is provided in Appendix E.

1.3.3 PLAN IMPLEMENTATION

Section 10643
An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

The City of Arcadia is committed to the implementation of it's 2010 Plan in accordance with Section 10643 of the Act, including the water demand management measures (DMMs) (see Chapter 6) and water conservation requirements of SBX7-7 (see Chapter 3). The City continues to be committed to the concept of good water management practice and intends to expand its water conservation program as budgets and staffing allow. The City's water conservation program will periodically be re-evaluated and modified to institute additional methods or techniques as the need arises. The City reviewed implementation of its 2005 Plan and incorporated changes to create the 2010 Plan.

1.3.4 PLAN SUBMITTAL

Section 10644(a)
An urban water supplier shall submit to the department, the California State Library, and any City or County within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any City or county within which the supplier provides water supplies within 30 days after adoption.

Within 30 days of adoption of the Plan by the City Council, a copy of the Plan will be filed with the DWR, the State of California Library, the County of Los Angeles Registrar / Recorders office, and the City Clerk's Office. Copies of the letters to DWR, State Library, and County of Los Angeles will be maintained in the City's file.

1.3.5 PUBLIC REVIEW

Section 10645
Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

Within 30 days after submittal of the 2010 Plan to DWR, the City will make the 2010 Plan available at City Clerk's Office located at City Hall during normal business hours and on the City's website.

1.3.6 PLAN DISTRIBUTION (RELIABILITY AND SUPPLY AND DEMAND)

Section 10635(b)
The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any City or County within which it provides water supplies no later than 60 days after submission of its urban water management plan.

Under section 10635 (b), the City of Arcadia is required to provide the reliability section and the supply and demand section of the City's Plan to any City or County within which the City of Arcadia provides water supplies no later than 60 days after submitting the 2010 Urban Water Management Plan to the DWR. As discussed in Section 1.3.4, within 30 days of adoption of the Plan by the City Council, the City will file a copy of the Plan with the DWR, the State of California Library, and the County of Los Angeles Registrar / Recorders office. The City will also place a hardcopy of the 2010 Plan at the City

Clerk's Office located at City Hall and will notify any City or County within which the City of Arcadia provides water supplies that a copy is available on its website.

Chapter 2
SYSTEM DESCRIPTION

2.1 BACKGROUND

2.1.1 CITY OF ARCADIA FORMATION AND LOCATION

The City of Arcadia is a mature residential community encompassing approximately 11.5 square miles, which lies northeast of Los Angeles in the north central area of the San Gabriel Valley and extends northward into the southerly slopes of the San Gabriel Mountains.

The City of Arcadia was incorporated in 1903, and in 1914 its citizens decided to construct a municipal water system. A bond issue was passed and by 1916 the City of Arcadia had purchased an existing water company, drilled wells, built reservoirs and installed thousands of feet of water main as well as fire hydrants and water meters.

In 1918, the State of California granted the City of Arcadia a domestic water supply permit. Since then, the City has improved its water system by drilling additional wells, building additional reservoirs, constructing booster pumps, and installing many miles of water mains. These improvements were assisted through two bond issues. The last bond was redeemed in 1966, and since then, all additional improvements have been funded by water sales, developers and federal grants.

The City provides water service to a majority of the City of Arcadia and encompasses an area of approximately 11.0 sq miles, as shown in Plate 1. The City currently derives its water supply from groundwater wells that produce water from two groundwater basins, the Main San Gabriel Basin and the Raymond Basin, with the Main San Gabriel Basin as the City's primary groundwater source. The locations of the City's

service area and the Main San Gabriel Basin and the Raymond Basin are shown in Plate 2.

The City is a sub-agency of the Upper San Gabriel Valley Municipal Water District (Upper District), a wholesale water agency. The locations of the City's service area and Upper District are shown in Plate 3.

2.2 SERVICE AREA PHYSICAL DESCRIPTION

Section 10631.
A plan shall be adopted in accordance with this chapter and shall do the following:
a) Describe the service area of the supplier; including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

2.2.1 SERVICE AREA

The City provides water service to a majority of the City of Arcadia and encompasses an area of approximately 11.0 sq miles. Based on the ratio of the area of the City's water system (11.0 sq miles) to the area of the City of Arcadia (11.5 sq miles), the City serves approximately 96 percent of the population of the City of Arcadia. The remaining portions of the City of Arcadia are provided water service by the San Gabriel Valley Water Company (SGVWC), Golden State Water Company (GSWC), California American Water Company (CAWC), Sunny Slope Water Company (Sunny Slope) and East Pasadena Water Company (East Pasadena). Plate 1 shows the locations of the City's water system service area, the City of Arcadia and the other water companies serving the City of Arcadia.

The City of Arcadia currently has a population of approximately 56,800. The City, which serves approximately 96 percent of the population of the City of Arcadia, is a

retail water agency and currently serves a population of approximately 54,500. The primary service connections are residential with some commercial/institutional, industrial and landscape irrigation users. It is estimated that the population in 2035 will be approximately 59,500 (see Chapter 2.3 below). The projected water demand and number of service connections by user category are discussed in Chapter 3.

2.2.2 CLIMATE

Historical rainfall in the San Gabriel Valley is shown in Table 2. Table 3 shows the monthly average rainfall, monthly average temperature and monthly evapotranspiration in the San Gabriel Valley. Average rainfall in the San Gabriel Valley is about 17.8 inches, as shown in Table 3. The annual rainfall in the San Gabriel Valley in water year 2008-09 was 14.0 inches, as shown in Table 2, which was 79 percent of the normal conditions for the area. The service area and location of the City in the San Gabriel Valley has a dry climate and summers can reach average daily temperatures in the high 70s. Although changes in climatic conditions will have an impact on water supply, the projected water supply demands will be based on average year, single dry year and multiple-dry years.

2.3 SERVICE AREA POPULATION

Section 10631.
A plan shall be adopted in accordance with this chapter and shall do the following:
a) Describe the service area of the supplier; including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

2.3.1 POPULATION

The City provides water service to an area of about 11 square miles and serves a current population of approximately 54,500. Table 4 presents the current and projected

population of the area encompassed by the City from 2010 to 2035. Projected populations within the City were estimated in a May 2010 Draft Water Supply Assessment, incorporated by reference, for the City of Arcadia's General Plan Update. Population projections were based on data obtained from the Southern California Association of Governments (SCAG). The SCAG data incorporates demographic trends, existing land use, general plan land use policies, and input and projections from the Department of Finance (DOF) and the US Census Bureau.

2.3.2 OTHER DEMOGRAPHIC FACTORS

There are no other demographic factors affecting the City's water management planning.

Chapter 3
SYSTEM DEMANDS

3.1 WATER DEMANDS

3.1.1 PAST, CURRENT, AND PROJECTED WATER DEMAND

Section 10631(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

- *(A) Single-family residential.*
- *(B) Multifamily.*
- *(C) Commercial.*
- *(D) Industrial.*
- *(E) Institutional and governmental.*
- *(F) Landscape.*
- *(G) Sales to other agencies.*
- *(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.*
- *(I) Agricultural*

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

The City's water demands are supplied by groundwater pumped from the Raymond Basin and Main San Gabriel Basin and treated imported surface water. The City's water supplies do not include recycled water. The City provides water service to the following water use sectors:

- Single-Family Residential
- Multi-Family Residential
- Commercial/Institutional
- Industrial
- Landscape Irrigation.

The City does not regularly provide water sales to other agencies and does not have any additional water uses. Table 5 shows the historical, current, and projected water use among water use sectors within the City's service area. Table 6 shows the historical, current, and projected total water demand and unaccounted water losses. The projected water use is calculated based on the urban per capita water use target developed per SBX7-7 (see Chapter 3.2 below) and population projections. Based on the projected water uses, the City does not anticipate any problem meeting its water demands.

3.1.2 PROJECTED WATER DEMAND FOR LOWER INCOME HOUSEHOLDS

Section 10631.1(a)

The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any City, County, or City and County in the service area of the supplier.

Based on Chapter 5, Tables H-3 and H-5, of the the City's General Plan dated November 2010, approximately 27.4 percent of the total housing units in the City are considered lower income units. Therefore, lower income households meters comprise approximately 27.4 percent of the total current number of residential meters. Based on a 27.4 percent use factor of total residential water demands, the projected water demand for lower income households is about 2,970 acre-feet per year by the year 2035, as shown on Table 6.

3.2 BASELINES AND TARGETS

Section 10608.20 (e)

An urban retail water supplier shall include in its urban water management plan required pursuant to Part 2.6 (commencing with Section 10610) due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

Methodologies for calculating baseline and compliance urban per capita water use for the consistent implementation of the Water Conservation Bill of 2009 have been published by DWR in its October 2010 guidance document.[2] DWR's guidance document was used by the City to determine the required water use parameters which are discussed below. The City developed the baselines and targets individually and not regionally.

3.2.1 BASELINE DAILY PER CAPITA WATER USE

The Baseline Daily Per Capita Water Use is defined as the average water use, expressed in gallons per capita per day (GPCD), for a continuous, multi-year baseline period. There are two different baseline periods for calculating Baseline Daily Per Capita Water Use, as follows (CWC Sections 10608.20 and 10608.22):

- *The first baseline period is a continuous 10- to 15-year period, and is used to calculate Baseline Per Capita Water Use per CWC Section 10608.20. The first baseline period is determined as follows:*
    - *If recycled water makes up less than 10 percent of 2008 retail water delivery, use a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*
    - *If recycled water makes up 10 percent or more of 2008 retail water delivery, use a continuous 10- to 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.*

[2] California Department of Water Resources, Division of Statewide Integrated Water Management, Water Use and Efficiency Branch. *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*. October 1, 2010.

The City does not have any recycled water use. Consequently, the first baseline period will consist of a continuous 10-year period that can be selected between 1995-96 and 2009-10.

- *The second baseline period is a continuous five-year period, and is used to determine whether the 2020 per capita water use target meets the minimum water use reduction per CWC Section 10608.22. The continuous five-year period shall end no earlier than December 31, 2007, and no later than December 31, 2010.*

  The second baseline period consisting of a continuous five-year period can be selected between 2003-04 and 2009-10.

Unless the urban water retailer's five-year Baseline Daily Per Capita Water Use per CWC Section 10608.12(b)(3) is 100 GPCD or less, Baseline Daily Per Capita Water Use must be calculated for both baseline periods.

The calculation of the Baseline Daily Per Capita Water Use entails the following four steps:

Step 1 *Calculate gross water use for each year in the baseline period using Methodology 1 in DWR's guidance document. According to Methodology 1, gross water use is a measure of water supplied to the distribution system over 12 months and adjusted for changes in distribution system storage and deliveries to other water suppliers that pass through the distribution system. Recycled water deliveries are to be excluded from the calculation of gross water use. Water delivered through the distribution system for agricultural use may be deducted from the calculation of gross water use. Under certain conditions, industrial process water use also may be deducted from gross water use.*

The calculated gross water use, based on recorded groundwater use (Raymond Basin and Main Basin) and imported surface water deliveries, for each year in the baseline period is shown on Table 7.

Step 2 *Estimate service area population for each year in the baseline period using Methodology 2 in DWR's guidance document. To obtain an accurate estimate of GPCD, water suppliers must estimate population of the areas that they actually serve, which may or may not coincide with either their jurisdictional boundaries or with the boundaries of cities. According to Methodology 2, data published by the California Department of Finance (DOF) or the U.S. Census Bureau must serve as the foundational building block for population estimates. In some instances, data published by these two sources may be directly applicable. In other instances, additional refinements may be necessary. For example, to account for distribution areas that do not match City boundaries, customers with private sources of supply, or other unique local circumstances, water suppliers may have to supplement the above sources of data with additional local data sources such as county assessor data, building permits data, and traffic analysis zone data. These refinements are acceptable as long as they are consistently applied over time, and as long as they build upon population data sources of the DOF or the U.S Census Bureau.*

The City's service area population for each year in the baseline period is based on data from SCAG, DOF, and the US Census Bureau (see Table 7).

Step 3 *Calculate daily per capita water use for each year in the baseline period. Divide gross water use (determined in Step 1) by service area population (determined in Step 2).*

The calculated daily per capita water use for each year in the baseline period is shown on Table 7.

Step 4 *Calculate Baseline Daily Per Capita Water Use. Calculate average per capita water use by summing the values calculated in Step 3 and dividing by the number of years in the baseline period. The result is Baseline Daily Per Capita Water Use for the selected baseline period.*

The average per capita water use calculated for a continuous 10-year baseline period (first baseline period) is shown on Table 7, with the highest value of 294 GPCD.

The Baseline Daily Per Capita Water Use for the City was determined to be **294 GPCD**, based on the highest value calculated for a continuous 10-year period (first baseline period) between 1995-96 and 2009-10 (see Table 7).

3.2.2 URBAN WATER USE TARGET

Section 10608.20 (b)

An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) *Eighty percent of the urban retail water supplier's baseline per capita daily water use.*

(2) *The per capita daily water use that is estimated using the sum of the following performance standards:*

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with

Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) *Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.*

(4) *A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:*

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

The Urban Water Use Target is determined using one of the following methods:

Method 1: Eighty percent of the urban retail water supplier's Baseline Per Capita Daily Water Use.

Using this method, the Urban Water Use Target for the City was calculated as **236 GPCD**, based on the City's Baseline Per Capita Daily Water Use of 294 GPCD.

Method 2: Estimate using the sum of the specified three performance standards.

Although this method was reviewed, this method was not considered due to insufficient data.

Method 3: *Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's 20x2020 Water Conservation Plan.*[3]

Based on the 20x2020 Water Conservation Plan, the City's service area lies in DWR Hydrologic Region 4 (South Coast), with an established Baseline Per Capita Daily Water Use of 180 GPCD and a Target Per Capita Daily Water Use of 149 GPCD. Using this method, the Urban Water Use Target for the City was calculated as **142 GPCD**.

Method 4: *Water Savings (Provisional)*

Although this method was reviewed, this method was not considered due to insufficient data.

The City's Urban Water Use Target was determined to be **236 GPCD** for 2020, based on Method 1 above.

3.2.3 COMPLIANCE DAILY PER CAPITA WATER USE

Compliance Daily Per Capita Water Use is defined as the Gross Water Use during the final year of the reporting period, and reported in GPCD. The Compliance Daily Per Capita Water Use will be reported in the City's 2015 Plan (interim compliance) and 2020 Plan (final compliance).

3.2.4 MINIMUM WATER USE REDUCTION REQUIREMENT

Section10608.22

Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as

[3] California Department of Water Resources, State Water Resources Control Board, California Bay-Delta Authority, California Energy Commission, California Department of Public Health, California Public Utilities Commission, and California Air Resources Board. *20x2020 Water Conservation Plan*. February 2010.

defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

The following calculation was made since the five-year Baseline Per Capita Water Use per CWC Section 10608.12(b)(3) is greater than 100 GPCD. The calculation is used to determine whether the City of Arcadia's 2015 and 2020 per capita water use targets meet the minimum water use reduction requirement per CWC Section 10608.22. The calculation entails three steps:

Step 1: *Calculate Baseline Daily Per Capita Water Use using a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.*

This value was calculated as **289 GPCD** (see Table 7).

Step 2: *Multiply the result from Step 1 by 0.95. The 2020 per capita water use target cannot exceed this value (unless the water supplier's five-year Baseline Per Capita Water Use is 100 GPCD or less). If the 2020 target is greater than this value, reduce the target to this value.*

This value was calculated as **274 GPCD**. The City's 2020 Urban Water Use Target was determined using Method 1 above to be 236 GPCD, which is lower than the value calculated in this step. Therefore, no adjustment is needed for the City's 2020 Urban Water Use Target of 236 GPCD.

Step 3: *Set the 2015 target to mid-point between the 10- or 15-year Baseline Per Capita Water Use and the 2020 target determined in Step 2.*

The City's 2015 Interim Urban Water Use Target is therefore set at **265 GPCD**, which is the mid-point between the 10-year Baseline Daily Per

Capita Water Use of **294 GPCD** and the 2020 Urban Water Use Target of **236 GPCD**.

Therefore, the City's 2015 Interim Urban Water Use Target of 265 GPCD and 2020 Urban Water Use Target of 236 GPCD meet the legislation's minimum water use reduction requirement per CWC Section 10608.22.

3.3 WATER DEMAND PROJECTIONS

Section 10631(k)

Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

The City has the ability to purchase and use treated imported surface water from Metropolitan Water District (MWD) of Southern California, through Upper District. The City notified Upper District of the development of its 2010 Plan. The City also provided notification to Upper District notifying that the draft Plan was available on the City's website. In addition, the City has participated in Upper District's development of its Urban Water Management Plan by providing data and attending meetings. Upper District in turn provided the City with a copy of their draft 2010 Plan, which is incorporated as a reference in this Plan.

3.4 WATER USE REDUCTION PLAN

10608.36.

Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

The City is not an urban wholesale water supplier. Therefore, this requirement is not applicable to the City.

3.5 PROGRESS REPORT

10608.40.

Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

The City will report to the DWR on its progress in meeting its urban water use targets, using a standardized form to be developed by the DWR, when the form becomes available.

Chapter 4
SYSTEM SUPPLIES

4.1 WATER SOURCES

Section 10631
A plan shall be adopted in accordance with this chapter and shall do the following:
b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).

The City's water supply sources include groundwater production from the Main Basin and Raymond Basin and direct delivery of treated imported water from MWD through Upper District.

Groundwater

The City currently owns and operates seven active groundwater wells in the Main Basin. These wells include Camino Real 3, Live Oak 1, Longden 1, Longden 2, Longley 3, Peck 1 and St. Joseph 2. The current capacity of the City's Main Basin wells is approximately 18,300 gallons per minute (gpm). The City also has seven active wells located within the Raymond Basin; Orange Grove 1A, Orange Grove 2A, Orange Grove 5, Orange Grove 6, Chapman 7, Colorado 1 and Anoakia 1. The current capacity of the City's Raymond Basin wells is approximately 4,760 gpm.

Treated Imported Water

The City of Arcadia can purchase treated imported water from Upper District, if necessary. The City can receive direct deliveries of treated imported water through its MWD connection, USG-6, which has a capacity of 20 cubic feet per second (about 14,500 acre-feet per year if used continuously). The City does not typically use service

connection USG-6 because the City's collective groundwater supplies are sufficient to meet water demands.

Recycled Water

A discussion of recycled water opportunities within the City's service area is provided in Section 4.5.

Total Water Supplies

The City's historical and projected water supplies from groundwater, imported surface water and recycled water are shown on Table 9. Table 10 provides the City's projected water supplies during future single and multiple dry year conditions.

4.2 GROUNDWATER

Section 10631(b)
If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:
1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

4.2.1 RAYMOND BASIN GROUNDWATER MANAGEMENT

Management of the water resources of the Raymond Basin is based on the Raymond Basin Judgment.[4] The City is a party to the Raymond Basin Judgment.

RAYMOND BASIN JUDGMENT

[4] City of Pasadena vs. City of Alhambra, et al, Los Angeles County Case No. Pasadena C-1323, Judgment entered December 23, 1944, modified April 29, 1955.

In 1937, the City of Pasadena filed suit to adjudicate water rights of the Raymond Basin. A copy of the Raymond Basin adjudication is located in Appendix F. The DWR was retained to prepare a Report of Referee which described the geology and hydrogeology of the Raymond Basin and identified the Safe Yield of the Raymond Basin as 21,900 acre-feet. In 1950, the City of Pasadena requested the Safe Yield of the Raymond Basin to be re-determined. Subsequently, the Court issued a Modification of Judgment on April 29, 1955 increasing the Safe Yield of the Raymond Basin to 30,622 acre-feet. This is referred to as the "Decreed Right of 1955" and water rights for all parties are shown in Appendix F. On January 17, 1974, the second modification of the Raymond Basin Judgment was signed allowing Parties credit for spreading of canyon diversions in spreading grounds in the vicinity of the Arroyo Seco, Eaton Wash and Santa Anita Creek Canyon.

The Raymond Basin Judgment adjudicated groundwater rights based on a long-term average yield of the Raymond Basin. The Decreed Right of 1955 provides the City of Arcadia with water rights to 2,118.0 AFY from the Pasadena Subarea and with water rights to 3,526.0 AFY from the Santa Anita Subarea. Due to recent multiple dry year conditions, the Raymond Basin Management Board has phased in a 30 percent reduction requirement over five years for all Decreed Rights to the Pasadena Subarea, beginning fiscal year 2009-10. As a result, the City's adjusted right to the Pasadena Subarea will be 1,482.6 AFY (0.7 x 2,118.0 AFY) by fiscal year 2013-14. The City's total water right in the Raymond Basin will be 5,008.6 AFY (1,482.6 AFY + 3,526.0 AFY) by fiscal year 2013-14. The Judgment allows a party to exceed its Decreed Right by no more than 10 percent, which will be deducted from the following year's total allowable extraction. Conversely, a party is not allowed to carryover more than 10 percent of its Decreed Right to a subsequent year. Over the past twenty years, on average, the City of Arcadia has been able to extract groundwater in excess of its Decreed Right as a result of water rights leases.

4.2.2 MAIN BASIN GROUNDWATER MANAGEMENT

The Main Basin has been adjudicated and management of the local water resources within the Main Basin is based on its adjudication. Management of the water resources in the San Gabriel Valley is based upon Watermaster services under two Court Judgments: San Gabriel River Watermaster (River Watermaster)[5] and Main San Gabriel Basin Watermaster (Basin Watermaster)[6]. The City is a defendant in the Main Basin Judgment and as such had participation. The City also participates in the Main Basin management described in the Main Basin Watermaster document entitled "Five-Year Water Quality and Supply Plan." The City is a defendant in the Long Beach Judgment and as such has significant participation.

The following sections provide a description of the two Judgments and the Five Year Water Quality and Supply Plan that make up the groundwater management plan for the Main Basin. In addition, this section describes Upper District's and Water Quality Authority's (WQA) policies to promote groundwater basin clean-up.

LONG BEACH JUDGMENT

On May 12, 1959, the Board of Water Commissioners of the City of Long Beach, Central Basin Municipal Water District (Central Basin) and the City of Compton, as plaintiffs, filed an action against the San Gabriel Valley Water Company and 24 other producers of groundwater from the San Gabriel Valley as defendants. This action sought a determination of the rights of the defendants in and to the waters of the San Gabriel River system and to restrain the defendants from an alleged interference with the rights of plaintiffs and persons represented by the Central Basin in such waters. After six years of study and negotiation a Stipulation for Judgment was filed on February

5 Board of Water Commissioners of the City of Long Beach, et al., v. San Gabriel Valley Water Company, et al., Los Angeles County Case No. 722647, Judgment entered September 24, 1965.
6 Upper San Gabriel Valley Municipal Water District v. City of Alhambra, et al., Los Angeles County Case No. 924128, Judgment entered January 4, 1973.

10, 1965, and Judgment (Long Beach Judgment) was entered on September 24, 1965. Under the terms of the Long Beach Judgment, the water supply of the San Gabriel River system was divided at Whittier Narrows, the boundary between San Gabriel Valley upstream and the coastal plain of Los Angeles County downstream. A copy of the Long Beach Judgment is located in Appendix G.

Under the terms of the Long Beach Judgment, the area downstream from Whittier Narrows (Lower Area), the plaintiffs and those they represent, are to receive a quantity of usable water annually from the San Gabriel River system comprised of usable surface flow, subsurface flow at Whittier Narrows and water exported to the Lower Area. This annual entitlement is guaranteed by the area upstream of Whittier Narrows (Upper Area), the defendants, and provision is made for the supply of Make-Up Water by the Upper Area for years in which the guaranteed entitlement is not received by the Lower Area.

Make-Up Water is imported water purchased by the Main Basin Watermaster and delivered to agencies within Central Basin to satisfy obligations under the Long Beach Judgment. The entitlement of the Lower Area varies annually, dependent upon the 10-year average annual rainfall in San Gabriel Valley for the 10 years ending with the year for which entitlement is calculated.

The detailed operations described in the Long Beach Judgment are complex and require continuous compilation of data so that annual determinations can be made to assure compliance with the Long Beach Judgment. In order to do this, a three-member Watermaster was appointed by the Court, one representing the Upper Area parties nominated by and through Upper District, one representing the Lower Area parties nominated by and through Central Basin, and one jointly nominated by Upper District and Central Basin. This three-member board is known as the River Watermaster.

The River Watermaster meets periodically during the year to adopt a budget, to review activities affecting water supply in the San Gabriel River system area, to compile and review data, to make its determinations of usable water received by the Lower Area and to prepare an annual report to the Court and to the Parties. The River Watermaster has rendered annual reports for the water years 1963-64 through 2008-09 and operations of the river system under the Long Beach Judgment and through the administration by the River Watermaster have been very satisfactory since its inception.

One major result of the Long Beach Judgment was to leave the Main Basin free to manage its water resources so long as it meets its downstream obligation to the Lower Area under the terms of the Long Beach Judgment.

MAIN BASIN JUDGMENT

The Upper Area then turned to the task of developing a water resources management plan to optimize the conservation of the natural water supplies of the area. Studies were made of various methods of management of the Main Basin as an adjudicated area and a report thereon was prepared for the Upper San Gabriel Valley Water Association, an association of water producers in the Main Basin, including the City. After consideration by the Association membership, Upper District was requested to file as plaintiff, and did file, an action on January 2, 1968, seeking an adjudication of the water rights of the Main Basin and its Relevant Watershed. In this Judgment, the City was included as a Party. After several years of study (including verification of annual water production) and negotiations, a stipulation for entry of Judgment was approved by a majority of the Parties, by both the number of parties and the quantity of rights to be adjudicated. Trial was held in late 1972 and Judgment (Main Basin Judgment) was entered on January 4, 1973. A copy of the Main Basin Judgment is located in Appendix H.

Under the terms of the Main Basin Judgment, all rights to the diversion of surface water and production of groundwater within the Main Basin and its Relevant Watershed were adjudicated. The Main Basin Judgment provides for the administration of the provisions of the Main Basin Judgment by a nine-member Watermaster. Six of those members are nominated by water producers (producer members) and three members (public members) are nominated by the Upper District and San Gabriel Valley Municipal Water District (SGVMWD), which overlie most of the Main Basin. The nine-member board employs a staff, an attorney and a consulting engineer. The Main Basin Watermaster holds public meetings on a regular monthly basis through the year. A copy of the Main Basin Watermaster's Rules and Regulations is located in Appendix I.

The Main Basin Judgment does not restrict the quantity of water, which Parties may extract from the Main Basin. Rather, it provides a means for replacing all annual extractions in excess of a Party's annual right to extract water with Supplemental Water. The Main Basin Watermaster annually establishes an Operating Safe Yield for the Main Basin which is then used to allocate to each Party its portion of the Operating Safe Yield which can be produced free of a Replacement Water Assessment. If a producer extracts water in excess of its right under the annual Operating Safe Yield, it must pay an assessment for Replacement Water, which is sufficient to the purchase of one acre-foot of Supplemental Water to be spread in the Main Basin for each acre-foot of excess production. All water production is metered and is reported quarterly to the Basin Watermaster.

In addition to Replacement Water Assessments, the Main Basin Watermaster levies an Administration Assessment to fund the administration of the Main Basin management program under the Main Basin Judgment, and a Make-Up Obligation Assessment in order to fulfill the requirements for any Make-Up Obligation under the Long Beach Judgment and to supply 50 percent of the administration costs of the River Watermaster service. The Main Basin Watermaster also levies an In-Lieu Assessment and may levy special Administration Assessments.

Water rights under the Main Basin Judgment are transferable by lease or purchase so long as such transfers meet the requirements of the Main Basin Judgment. There is also provision for Cyclic Storage Agreements by which Parties and Non-Parties may store imported Supplemental Water in the Main Basin under such agreements with the Main Basin Watermaster pursuant to uniform rules and conditions and Court approval.

The Main Basin Judgment provides that the Main Basin Watermaster will not allow imported water to be spread in the main part of the Main Basin when the groundwater elevation at the Baldwin Park Key Well[7] (Key Well) exceeds 250 feet; and that the Main Basin Watermaster will, insofar as practicable, spread imported water in the Main Basin to maintain the groundwater elevation at the Key Well above 200 feet. One of the principal reasons for the limitation on spreading imported water when the Key Well elevation exceeds 250 feet is to reserve ample storage space in the Main Basin to capture native surface water runoff when it occurs and to optimize the conservation of such local water. Under the terms of the Long Beach Judgment, any excess surface flows that pass through the Main Basin at Whittier Narrows to the Lower Area (which is then conserved in the Lower Area through percolation to groundwater storage) is credited to the Upper Area as Usable Surface Flow.

OPERATIONS OF THE GROUNDWATER BASIN

Through the Long Beach Judgment and the Main Basin Judgment, operations of the Main Basin are optimized to conserve local water to meet the needs of the parties of the Main Basin Judgment.

[7] The Baldwin Park Key Well is a water level monitoring well located in the City of Baldwin Park used to determine when imported water may or may not be spread in the Basin.

Typically, water producers within Upper District rely upon groundwater from Main Basin for their water supply. The City of Alhambra has agreed to receive treated, imported water as part of the Cooperative Water Exchange Agreement (CWEA) to reduce the groundwater extractions from the western portion of the Main Basin and the associated drawdown concerns.

Imported water for groundwater replenishment is delivered through the flood control channels and diverted and spread at spreading grounds through Basin Watermaster's agreement with the Los Angeles County Department of Public Works (DPW). Groundwater replenishment utilizes imported water and is considered Replacement Water under the terms of the Main Basin Judgment. It can be stored in the Main Basin through Cyclic Storage agreements, authorized by terms of the Main Basin Judgment, but such stored water may be used only to supply Supplemental Water to the Basin Watermaster.

The Basin Watermaster has entered into a Cyclic Storage Agreement with each of the three municipal water districts. One is with MWD and Upper District, which permits MWD to deliver and store imported water in the Main Basin in an amount not to exceed 100,000 acre-feet for future Replacement Water use. The second Cyclic Storage Agreement is with Three Valleys Municipal Water District (TVMWD) and permits MWD to deliver and store 40,000 acre-feet for future Replacement Water use. The third is with San Gabriel Valley Municipal Water District (SGVMWD) and contains generally the same conditions as the agreement with MWD except that the stored quantity is not to exceed 40,000 acre-feet. As of the end of fiscal year 2009-10, the City has a cyclic storage account of 5,000 acre-feet with an ending balance of approximately 570 acre-feet within cyclic storage.

Imported Make-up Water has been delivered to lined stream channels and conveyed to the Lower Area. Make-up Water is required to be delivered to the Lower Area by the Upper Area when the Lower Area entitlement under the Long Beach

Judgment exceeds the usable water received by the Lower Area. Imported water is used to fulfill the Make-up Water Obligation when the amount of Make-up Water cannot be fulfilled by reimbursing the Lower Area interests for their purchase of recycled water. The amount of recycled water for which reimbursement may be made as a delivery of Make-up Water is limited by the terms of the Long Beach Judgment to the annual deficiency in Lower Area Entitlement water or to 14,735 acre-feet, whichever is the lesser quantity.

FIVE-YEAR WATER QUALITY AND SUPPLY PLAN

The Main Basin Watermaster was created in 1973 to resolve water issues that had arisen among water users in the San Gabriel Valley. Main Basin Watermaster's mission is to generally manage the water supply of the Main Basin. During the late 1970s and early 1980s, significant groundwater contamination was discovered in the Main Basin. The contamination was caused in part by past practices of local industries that had carelessly disposed of industrial solvents referred to as volatile organic compounds (VOCs) as well as by agricultural operations that infiltrated nitrates into the groundwater. Cleanup efforts were undertaken at the local, state and federal level.

By 1989, local water agencies, including the City, adopted a joint resolution regarding water quality issues that stated that Main Basin Watermaster should coordinate local activities aimed at preserving and restoring the quality of groundwater in the Main Basin. The joint resolution also called for a cleanup plan. In 1991, the Court granted Main Basin Watermaster the authority to control pumping for water quality purposes. Accordingly, Main Basin Watermaster added Section 28 to its Rules and Regulations regarding water quality management. The new responsibilities included development of a Five-Year Water Quality and Supply Plan, updating it annually, submitting it to the California Regional Water Quality Control Board, Los Angeles Region, and making it available for public review by November 1 of each year. A copy of the "Five-Year Water Quality and Supply Plan" is located in Appendix J.

The Main Basin Watermaster prepares and annually updates the Five-Year Water Quality and Supply Plan in accordance with the requirements of Section 28 of its Rules and Regulations. The objective is to coordinate groundwater-related activities so that both water supply and water quality in the Main Basin are protected and improved. Many important issues are detailed in the Five-Year Plan, including how the Main Basin Watermaster plans to:

1. monitor groundwater supply and quality;
2. develop projections of future groundwater supply and quality;
3. review and cooperate on cleanup projects, and provide technical assistance to other agencies;
4. assure that pumping does not lead to further degradation of water quality in the Main Basin;
5. address perchlorate, N-nitrosodimethylamine (NDMA), and other emerging contaminants in the Main Basin;
6. develop a cleanup and water supply program consistent with the EPA plans for its San Gabriel Valley Superfund sites; and
7. coordinate and manage the design, permitting, construction, and performance evaluation of the Baldwin Park Operable Unit (BPOU) cleanup and water supply plan.

The Main Basin Watermaster, in coordination with Upper District, has worked with state and federal regulators, along with local water companies to clean up water supplies. Section 28 of the Main Basin Watermaster's Rules and Regulations require all producers (including the City) to submit an application to 1) construct a new well, 2) modify an existing well, 3) destroy a well, or 4) construct a treatment facility. Main Basin Watermaster prepares a report on the implications of the proposed activity. As a Party to the Main Basin Judgment, the City of Arcadia reviews a copy of these reports and is

provided the opportunity to submit comments on the proposed activity before Main Basin Watermaster Board takes its final action.

4.2.3 DESCRIPTION OF GROUNDWATER BASIN

Section 10631(b)(2)

A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

4.2.3.1 RAYMOND BASIN

The Raymond Basin is located in Los Angeles County about 10 miles north-easterly of downtown Los Angeles. Raymond Basin is a wedge in the northwesterly portion of the San Gabriel Valley and is bounded on the north by the San Gabriel Mountains, on the west by the San Rafael Hills, and is separated from the Main Basin on the southeast by the Raymond Fault. The Raymond Basin is divided into the Eastern Unit, which is the Santa Anita Sub-Area, and the Western Unit which is the Pasadena Sub-Area and the Monk Hill Sub-Area. The location of the Raymond Basin and the subareas is shown on Plate 2. The surface area of Raymond Basin is about 40.9 square miles.

The principal streams in the Raymond Basin are the Arroyo Seco, Eaton Wash, and Santa Anita Wash. The Arroyo Seco drains to the Los Angeles River, while Eaton Wash and Santa Anita Wash drain to the Rio Hondo, a distributary of the San Gabriel River.

Adjudication of water rights in the Raymond Basin is discussed in Chapter 4.2.1.1 above, including a description of the amount of groundwater the City has the legal right to pump.

GEOLOGY

The geology of the Raymond Basin is described in details in the "Report of Referee" prepared in 1943 by the DWR and is summarized below.

The Raymond Basin is roughly triangular in shape. Its northern boundary, about 12 miles in length, is formed by a portion of the southerly front of the San Gabriel Mountains. The western boundary of the Raymond Basin is about 8 miles long and is also composed chiefly of the same Basement Complex rocks which form the mountains and which are continuous at depth, together with a small area of marine Tertiary sediment at the southern end. The Raymond Fault, which is the southern boundary of the triangle, crosses the Valley floor for a distance of about 9 miles, connecting a granitic spur from the mountains at the eastern end of the Raymond Basin with Tertiary sediments outcropping in its southwestern corner.

The Raymond Fault separates Raymond Basin from the Main Basin. The fault zone is not impervious and groundwater can flow across this boundary into the Main Basin. The source of natural groundwater supply to the Raymond Basin is direct rainfall, percolation from surface runoff from the northern and western sides, and presumably some underground percolation of water from the mountain mass to the alluvium.

HYDROGEOLOGY

DWR describes the hydrogeology of the Raymond Basin in its Bulletin 118. According to the report, the water-bearing materials of the Raymond Basin are

dominated by unconsolidated Quaternary alluvial gravel, sand, and silt deposited by streams flowing out of the San Gabriel Mountains. Younger alluvium typically follows active streambeds and reaches a maximum thickness of about 150 feet. Older alluvium generally thickens southward from the mountain front, reaching a maximum of about 1,140 feet near Pasadena, then thins to about 200 feet near the Raymond Fault. However, confined groundwater conditions have existed locally in the Raymond Basin, particularly along the Raymond Fault near Raymond Hill where layers of finer grained sediments become more abundant.

The Raymond Fault trends east-northeast and acts as a groundwater barrier along the southern boundary of the Raymond Basin. This fault acts as a complete barrier along its western end and becomes a less effective barrier eastward. East of Santa Anita Wash, this fault ceases to be an effective barrier and the flow of groundwater southward into the Main Basin becomes essentially unrestricted. A north-trending divide paralleling the Eaton Wash separates both surface and subsurface water flow in the eastern portion of the Raymond Basin. The water level is higher on the eastern side of this divide, ranging from 300 feet higher in the north to about 50 feet higher in the south. Groundwater contour maps for the Raymond Basin (prepared for the Raymond Basin Annual Report) are included in Appendix I.

Natural recharge to the Raymond Basin is mainly from direct percolation of precipitation and percolation of ephemeral stream flow from the San Gabriel Mountains in the north. The principal streams bringing surface inflow are the Arroyo Seco, Eaton Creek, Little Santa Anita Creek (Sierra Madre Wash), and Santa Anita Creek. Some stream runoff is diverted into spreading grounds and some is impounded behind small dams allowing the water to infiltrate and contribute to groundwater recharge of the Raymond Basin. An unknown amount of underflow enters the Raymond Basin from the San Gabriel Mountains through fracture systems.

The Santa Anita Sub-Area is replenished only by local storm runoff that is percolated in the Santa Anita and Sierra Madre Spreading Grounds. Currently, there is no means of delivering untreated imported water into the Santa Anita Sub-Area. Consequently, water levels in the Santa Anita Sub-Area of Raymond Basin have declined by over 100 feet in the past 10 years. Hydrographs from the Raymond Basin Annual Report of 2009-10 show the water levels in the Santa Anita Sub-Area have decreased (see Appendix K, Figure 11). Consequently, the yield from the City's wells has also fluctuated and has demonstrated a concurrent decrease.

Water levels in the Pasadena Sub-Area of Raymond Basin have also generally declined in the past 10 years. Hydrographs from the Raymond Basin Annual Report of 2009-10 show the water levels in the Pasadena Sub-Area have decreased (see Appendix K, Figures 10a and 10b).

WATER QUALITY MONITORING

According to the Raymond Basin Annual Report of 2009-10, in general water in the Basin continues to be of good quality regarding most constituents, except for a few sources with high fluoride concentrations in the foothills and high nitrate concentrations in the Monk Hill Sub-Area and Pasadena Sub-Area. VOC contaminants have been detected in several areas. In June 1997, perchlorate was detected in several Basin wells and several monitoring wells at the Jet Propulsion Laboratory (JPL) Superfund site.

The City has a blend program to reduce Nitrate and VOC concentrations to below 80 percent of California Department of Pubic Health (CDPH) standards. As a result of the City's blending activities, the City's wells are expected to provide a reliable water source from the Raymond Basin to City customers for the next 25 years. Although unanticipated changes in blending activities could result in a loss of Raymond

Basin well capacity, the City can reliably produce groundwater from the Main Basin and can obtain treated imported water from USG-6 to meet demands.

4.2.3.2 MAIN SAN GABRIEL BASIN

The Main Basin is located within the San Gabriel Valley in southeastern Los Angeles County and is bounded on the north by the San Gabriel Mountains; on the west by the San Rafael and Merced Hills, on the south by the Puente Hills and the San Jose Hills, and on the east by a low divide between the San Gabriel River system and the Upper Santa Ana River system, as shown on Plate 2.

The San Gabriel River and its distributary, the Rio Hondo, drain an area of about 490 square miles upstream of Whittier Narrows. Whittier Narrows is a low gap between Merced and Puente Hills, just northwest of the City of Whittier, through which the San Gabriel River and the Rio Hondo flow to the coastal plain of Los Angeles County. Whittier Narrows is a natural topographic divide and a subsurface restriction to the movement of groundwater between the Main Basin and the Coastal Plain. Approximately 490 square miles of drainage area upstream of Whittier Narrows consists of about 167 square miles of valley lands and about 323 square miles of mountains and foothills.

The Main Basin includes essentially the entire valley floor of San Gabriel Valley with the exception of the Raymond Basin and Puente Basin. The boundaries of the Main Basin are the Raymond Basin on the northwest, the base of the San Gabriel Mountains on the north, the groundwater divide between San Dimas and La Verne and the lower boundary of the Puente Basin on the east, and the common boundaries between Upper District and Central District through Whittier Narrows on the southwest. The common water supply of the Main Basin does not include the Raymond Basin, the area northerly of Raymond Hill Fault, which was adjudicated in the Pasadena v. Alhambra case (Superior Court of the County of Los Angeles, 1944). The Puente

Basin, although tributary to the Main Basin, is not included in the Main Basin administered by the Basin Watermaster.

The Main Basin (administered by the Main Basin Watermaster) is a large groundwater basin replenished by stream runoff from the adjacent mountains and hills, by rainfall directly on the surface of the valley floor, subsurface inflow from Raymond Basin and Puente Basin, and by return flow from water applied for overlying uses. Additionally, the Main Basin is replenished with imported water. The Main Basin serves as a natural storage reservoir, transmission system and filtering medium for wells constructed therein.

There are three municipal water districts overlying and/or partially overlying the Main Basin. The three districts are Upper District, SGVMWD, and TVMWD. The boundaries of these water districts are shown on Plate 3.

Urbanization of the San Gabriel Valley began in the early part of the twentieth century, but until the 1940's, agricultural land use occupied more area than residential and commercial land use. After World War II, agricultural areas reduced rapidly and are now less than two thousand acres. The agricultural areas tend to be located in the easterly portion of the Main Basin and along power transmission rights of way adjacent to the San Gabriel River. Agricultural plots are discontinuous and relatively small. There are several major industrial areas adjacent to the San Gabriel River and within other portions of the valley. The greatest area of land use in the valley is for residential and commercial purposes. The California Department of Water Resources' Bulletin 118 does not identify the Main Basin as being in overdraft.

MAIN BASIN GEOLOGY

The Main Basin consists of a roughly bowl-shaped depression of bedrock, filled over millions of years with alluvial deposits. This bowl-shaped depression is relatively

deep; the elevation at the base of the groundwater reservoir declines from about 800 feet above mean sea level (MSL) in the vicinity of San Dimas, at the northeast corner of the Main Basin, to about 2,200 feet below MSL in the vicinity of South El Monte (DWR, 1966, Plate II).

Most of the alluvium deposited within this depression is debris from the San Gabriel Mountains, washed and blown down from the side of the mountains over time. This process has also resulted in the materials of the Main Basin varying in size from relatively coarse gravel nearer the mountains to fine and medium-grained sand containing silt and clay as the distance from the mountains increases. The principal water-bearing formations of the Main Basin are unconsolidated and semi-consolidated sediments, which vary in size from coarse gravel to fine-grained sands. The interstices between these alluvial particles throughout the Main Basin fill with water and transmit water readily to wells. The thickness of the water-bearing materials in the Main Basin ranges from 200 to 300 feet in the northeastern portion of the Main Basin near the mountains (DPW, 1934, page 141) to nearly 4,000 feet in the South El Monte area (DWR, 1966, page 31).

The soils overlying the Main Basin average about six feet in depth. Soil depths are generally greater at the perimeter of the valley and decrease toward the center along the San Gabriel River. These soils are residual, formed in place through chemical, mechanical and plant weathering processes. The infiltration rates of these soils are greater along the natural channels and their adjacent flood plains. Lower infiltration rates are found in the perimeter areas of the valley. Since the valley is mostly urbanized, a significant portion of the area has been paved and many miles of stream channel have been lined for flood control purposes, thus decreasing infiltration of water through streambeds. Detailed basin geology is discussed in the report entitled “Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geo-hydrology” (DWR, 1966).

MAIN BASIN HYDROLOGY

The total fresh water storage capacity of the Main Basin is estimated to be about 9.5 million acre-feet. Of that, about 1,100,000 acre-feet have been used historically in Main Basin operations. The change in groundwater elevation at the Key Well is representative of changes in groundwater in the Main Basin. One foot of elevation change at the Key Well is roughly the equivalent of about 8,000 acre-feet of water storage. The location of the Key Well is shown on Plate 5 and the hydrograph of the Key Well is shown on Figure 1. The historical high groundwater elevation was recorded at over 329.1 feet in April 1916, at which time Main Basin storage was estimated to be about 8,700,000 acre-feet. The historical low was recorded in December 2009 at 189.2 feet, at which time Main Basin storage was estimated to be about 7,600,000 acre-feet. The Key Well hydrograph shown on Figure 1 illustrates the cyclic nature of basin recharge and depletion. The hydrograph also illustrates the dramatic recharge capability of the Main Basin during wet periods.

Generally, water movement in the Main Basin is from the San Gabriel Mountains on the north to Whittier Narrows to the southwest, as shown on Plate 5. Groundwater movement in the northern and northeastern regions of the Main Basin is affected by faulting. For example, the Raymond Fault located in the northwesterly portion of the Main Basin separates the Raymond Basin from the Main Basin.

The Main Basin is an unconfined aquifer. Although clay deposits appear mixed with the soils in several locations in the Main Basin and there are various clay lenses throughout the Main Basin, they do not coalesce to form a single impermeable barrier for the movement of subsurface water. The Main Basin therefore operates as a single, unconfined aquifer. As previously mentioned, a thorough discussion of basin hydrogeology is contained in the report “Planned Utilization of Ground Water Basins, San Gabriel Valley, Appendix A: Geo-hydrology” (DWR, 1966).

Within the Main Basin there are a number of identified sub-basins. These include the Upper San Gabriel Canyon Basin, Lower San Gabriel Canyon Basin, Glendora Basin, Foothill Basin, Way Hill Basin and San Dimas Basin. In addition, the Puente Basin is tributary to the Main Basin from the southeast, between the San Jose and Puente Hills, but is not included in the Main Basin adjudication. Plate 5 shows the location of the sub-basins within the Main Basin.

MAIN BASIN GROUNDWATER REPLENISHMENT

The major sources of recharge to the Main Basin are direct penetration of rainfall on the valley floor, percolation of runoff from the mountains, percolation of imported water and return flow from applied water. Rainfall occurs predominantly in the winter months and is more intense at higher elevations and closer to the San Gabriel Mountains. Table 2 shows historical annual rainfall, which is highly variable from year to year, in the San Gabriel Valley. In water year 2006-07 the total rainfall (four station average) was less than five inches, while in 2004-05 the total rainfall (four station average) was about 45 inches, as shown on Table 2.

The magnitude of annual recharge from direct penetration of local rainfall and return flow from applied water is not easily quantifiable. Percolation of runoff from the mountains and valley floor along with percolation of imported water has only been estimated. The DPW maintains records on the amount of local and imported water conserved in water spreading facilities and stream channels.

The San Gabriel River bisects the Main Basin. The San Gabriel River originates at the confluence of its west and east forks in the San Gabriel Mountains. It flows through the San Gabriel Canyon and enters the Main Basin at the mouth of the canyon north of the City of Azusa. The San Gabriel River flows southwesterly across the valley to Whittier Narrows, a distance of about 15 miles. It exits San Gabriel Valley at Whittier

Narrows, and transverses the Coastal Plain in a southerly direction to reach the Pacific Ocean at Alamitos Bay near the City of Long Beach.

The San Gabriel River is joined and fed by tributary creeks and washes. In the Main Basin these include: Big Dalton Wash, which originates in the San Gabriel Mountains; Walnut Creek, which originates at the northeast end of the San Jose Hills; and San Jose Creek, which originates in the San Gabriel Mountains, but which travels around the southerly side of the San Jose Hills through the Puente Narrows before joining the San Gabriel River just above Whittier Narrows.

The channel of the San Gabriel River bifurcates in the upper middle portion of the Main Basin, forming a channel to the west of and parallel to the San Gabriel River, known as the Rio Hondo. Tributaries draining the westerly portion of the Main Basin, including Sawpit Wash, Santa Anita Wash, Eaton Canyon Wash, Rubio Wash and Alhambra Wash, all of which originate in the San Gabriel Mountains or the foothills, feed the Rio Hondo. The Santa Anita Wash, Eaton Canyon Wash, Rubio Wash and Alhambra Wash all cross the Raymond Basin area before entering the Main Basin. The channel of the Rio Hondo passes through Whittier Narrows westerly of the San Gabriel River, and then flows southwesterly to join the Los Angeles River on the Coastal Plain.

To protect residents of the San Gabriel Valley from flooding that can result during periods of intensive rainfall, the DPW and the U.S. Army Corps of Engineers (Corps of Engineers) have constructed an extensive system of dams, debris basins, reservoirs and flood control channels, which are shown on Plate 5. The dams and reservoirs also operate as water conservation facilities. The dams and reservoirs that control the flow of the San Gabriel River and the Rio Hondo include: Cogswell Reservoir on the west fork of the San Gabriel River, San Gabriel Reservoir at the confluence of the west and east forks of the San Gabriel River, Morris Reservoir near the mouth of the San Gabriel Canyon, Santa Fe Reservoir in the northerly portion of the Main Basin and Whittier Narrows Reservoir at the southwestern end of the San Gabriel Valley.

Many of the stream channels tributary to the San Gabriel River have been improved with concrete banks (walls) and concrete-lined bottoms. These stream channel improvements have significantly reduced the area of previous stream channels and reduce Main Basin recharge. A number of off-stream groundwater replenishment facilities have been established along these stream channels to offset such reductions in recharge. The locations of these water spreading facilities are shown on Plate 5. Some of these facilities are accessible to imported water supplies, while some facilities receive only local runoff.

The paths of the surface streams are mirrored in the soils and in the direction of groundwater movement in the Main Basin. The tributary creeks and washes, carrying smaller amounts of water, generally flow toward the center of the San Gabriel Valley, while the direction of flow of the major streams, the San Gabriel River and the Rio Hondo, is from the mountains in the north to Whittier Narrows in the southwest. In similar fashion, the primary direction of groundwater movement in the Main Basin is from the north to the southwest, with contributing movement generally from the east and west toward the center of the Main Basin as shown on Plate 6. The greatest infiltration and transmissivity rates of soils in the Main Basin are from north to south, with the maximum rates found in the center of the valley along the stream channels. Generally, the Main Basin directs groundwater to the southwest through Whittier Narrows.

4.2.4 LOCATION, AMOUNT AND SUFFICIENCY OF GROUNDWATER PUMPED FOR THE PAST FIVE YEARS

Section 10631(b)(3)

A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

4.2.4.1 GROUNDWATER SOURCES IN RAYMOND BASIN

The City produces groundwater through its eight active wells in the Raymond Basin, as discussed in Section 4.1. The City's historical groundwater production in Raymond Basin over the past 15 years is shown on Table 9. The Decreed Right of 1955 provides the City with water rights to 2,118.0 AFY from the Pasadena Subarea and with water rights to 3,526.0 AFY from the Santa Anita Subarea. As discussed in Section 4.2.1, the Raymond Basin Management Board has phased in a 30 percent reduction requirement over five years for all Decreed Rights to the Pasadena Subarea, beginning fiscal year 2009-10. As a result, the City's adjusted right to the Pasadena Subarea will be 1,482.6 AFY by fiscal year 2013-14. The City's total water right in the Raymond Basin will be 5,008.6 AFY by fiscal year 2013-14. The City's groundwater production from the Raymond Basin from 2006 to 2010 has averaged approximately 5,480 AFY.

4.2.4.2 GROUNDWATER SOURCES IN MAIN BASIN

The City produces groundwater through its seven active wells in the Main Basin, as discussed in Section 4.1. The City's historical groundwater production in the Main Basin over the past 15 years is shown on Table 9. The groundwater supply from the Main Basin is pumped to the City's reservoir storage facilities and then delivered to the City's customers. The City's groundwater production from the Main Basin from 2006 to 2010 has averaged approximately 11,290 AFY.

4.2.5 LOCATION, AMOUNT AND SUFFICIENCY OF GROUNDWATER PROJECTED TO BE PUMPED

Section 10631(b)(4)

A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis

shall be based on information that is reasonably available, including, but not limited to, historic use records.

4.2.5.1 GROUNDWATER SOURCES IN RAYMOND BASIN

As discussed in Chapter 4.2.1.1, the Raymond Basin has been adjudicated and is managed. During the period of management under the Raymond Basin Judgment, significant drought events have occurred from 1969 to 1977, 1983 to 1991, 1998 to 2004, and 2006-07 to 2008-09. In general, in each drought cycle, the City was able to obtain sufficient supplies from the Raymond Basin to meet its demands, as shown on Table 9. However groundwater levels, as shown in Appendix K, have declined over 100 feet in the past 10 years impacting the collective pumping capacity of the City's wells. Although the Raymond Basin has been managed for about 70 years under the adjudication, water levels continue to decrease. Based on historical and ongoing water levels, as well as the 30 percent reduction requirement over five years for all Decreed Rights to the Pasadena Subarea, the City's groundwater supplies in the Raymond Basin have been reduced. The City will be able to rely on the Raymond Basin for water supply over the next 25 years under single year and multiple year droughts. The groundwater projected to be pumped by the City from the Raymond Basin is shown on Table 9. Details on any changes or expansion planned for the groundwater supply is provided in Chapter 4.6 below.

4.2.5.2 GROUNDWATER SOURCES IN MAIN BASIN

As noted in Section 4.2.1.1 the Main Basin is managed by the Basin Watermaster. Section 42, Basin Operating Criteria, of the Main Basin Judgment states in part "…Watermaster shall not spread Replacement Water when the water level at the Key Well exceeds Elevation two hundred fifty (250), and Watermaster shall spread Replacement Water, insofar as practicable, to maintain the water level at the Key Well above Elevation two hundred (200)." Figure 1 shows the historical fluctuation of the Key Well elevation and illustrates since the Main Basin was adjudicated in 1973, it generally

operated between an elevation 250 feet and 200 feet MSL. Furthermore, at elevation 200 feet MSL at the Key Well, the Main Basin has about 7,600,000 acre-feet of available storage. During the period of management under the Judgment, significant drought events have occurred from 1969 to 1977, 1983 to 1991, 1998 to 2004, and 2006 to present. In each drought cycle the Main Basin has been managed to maintain water levels. Therefore, based on historical and on-going management practices, the City will be able to rely on the Main Basin for adequate supply over the next 25 years under single year and multiple year droughts.

4.3 TRANSFER OPPORTUNITIES

Section 10631(d)

Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

4.3.1 SHORT-TERM

The City has emergency interconnections with other water agencies that serve as short-term emergency exchange opportunities. Emergency interconnections are distribution system interconnections between water agencies for use during critical situations where one system or the other is temporarily unable to provide sufficient potable water to meet its water demands and/or fire protection needs. An emergency interconnection will allow a water system to continue serving water during critical situations such as local water supply shortages as a result of earthquakes, fires, prolonged power outages and droughts. The City has the ability to receive water from interconnections with the following water agencies:

- Golden State Water Company (two way)
- Sunny Slope Water Company (two way)
- MWD – USG-6 Connection (one way- in)

4.3.2 LONG-TERM

As a Party to the Main Basin Judgment, the City can pump from the Main Basin. The Main Basin Judgment does not restrict the quantity of groundwater that can be produced, but provides for a Replacement Water assessment for production in excess of water rights. The City has entered into a Cyclic Storage agreement, described in Chapter 4.2.1.2, with the Main Basin Watermaster to store imported water in the Main Basin for a period of up to five years to be used to offset a future Replacement Water requirement. As of the end of fiscal year 2009-10, the City has a cyclic storage account of 5,000 acre-feet with an ending balance of approximately 570 acre-feet within cyclic storage.

4.4 DESALINATED WATER OPPORTUNITIES

Section 10631(i)
Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

The City pumps groundwater from the Raymond Basin which is low in Total Dissolved Solids (TDS) and does not require desalination. According to the City's 2010 Consumer Confidence Report, the average TDS value for the City's groundwater sources is about 310 milligrams per liter (mg/l) and ranges from 170 mg/l to 420 mg/l. The CDPH recommended level of TDS is 500 mg/l and water can be provided for long-term domestic use with TDS concentrations of up to 1,000 mg/l. Due to the low TDS concentration of the groundwater from the Raymond Basin, the City does not need to investigate the use of desalination as a long-term supply. However, there may be opportunities for use of desalinated ocean water as a potential water supply source in the future, through coordination with other agencies that have ocean desalination programs.

Groundwater produced from the Main Basin has acceptable TDS concentrations (less than secondary Maximum Contaminant Level (MCL) of 1,000 milligrams per liter or mg/l) and does not require desalination. The average TDS value for the City's wells is below its secondary MCL, based on recent data. CDPH recommended level is 500 mg/l and water can be provided for long-term domestic use with TDS concentrations of up to 1,000 mg/l. Due to the high quality (low TDS concentration) of the groundwater in the Main Basin, the City does not need to investigate the use of desalination to develop or reestablish a new long-term supply. As mentioned above, if the City needed to investigate the use of desalination to develop or reestablish a long-term supply of water, the City would coordinate with other agencies that have ocean desalination programs.

4.5 RECYCLED WATER OPPORTUNITIES

4.5.1 RECYCLED WATER AND POTENTIAL FOR USE

Section 10633

The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

The City does not have access to recycled water due to the lack of infrastructure to convey recycled water to the City. The City would have to construct transmission and distribution facilities to deliver recycled water to customers within its service area.

4.5.2 WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL

Section 10633

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

There are two water reclamation plants in the Basin; the Whittier Narrows Water Reclamation Plant (WNWRP) and the San Jose Creek Water Reclamation Plant (SJCWRP). The Los Angeles County Sanitation Districts (LACSD) operates both of these facilities. The method of disposal when treated recycled water is not used (non-recycled) is discharge to the San Gabriel River/Rio Hondo and eventually flows to the ocean.

The WNWRP, which began operation in 1962, was the first reclamation plant built by LACSD. It has a treatment capacity of about 15 million gallons per day (MGD) and provides coagulated, filtered and disinfected tertiary effluent. The WNWRP serves a population of approximately 150,000 people. The WNWRP produced 6.04 MGD (6,769 acre-feet per year) of coagulated, filtered, disinfected tertiary recycled water in fiscal year 2008-09. The volume of wastewater collected and treated is shown in Appendix L. An average of 5.901 MGD (6,613 acre-feet per year), or 97.7 percent of the recycled water produced during fiscal year 2008-09 at the WNWRP was re-used for landscape/plant irrigation and groundwater replenishment. The method of disposal when treated recycled water is not used (non-recycled) is discharge to the San Gabriel River and eventually flows to the ocean (see Appendix L).

The SJCWRP, which began operation in 1971, currently has a treatment capacity of about 100 MGD. The treatment level is coagulation, filtration and disinfection tertiary effluent. The SJCWRP has room for an expansion of an additional 25 MGD, although there is no schedule for such an expansion. The SJCWRP plant serves a population of approximately 1 million people, largely a residential population. The SJWRP produced 71.05 MGD (79,615 acre-feet per year) of coagulated, filtered, disinfected tertiary recycled water in fiscal year 2008-09. The volume of wastewater collected and treated is shown in Appendix L. An average of 26.23 MGD (29,392 acre-feet per year), or 36.9 percent of the recycled water produced during fiscal year 2008-09 at the SJCWRP was

re-used for landscape irrigation, agricultural irrigation, industrial use, impoundment and groundwater replenishment. The method of disposal when treated recycled water is not used (non-recycled) is discharge to the San Gabriel River and eventually flows to the ocean (see Appendix L).

4.5.3 CURRENT RECYCLED WATER USE

Section 10633
(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use

The City currently does not have any recycled water use within its service area. Therefore, this requirement is currently not applicable to the City.

4.5.4 POTENTIAL USES OF RECYCLED WATER

Section 10633
(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

The City's "Draft Recycled Water Feasibility Study", November 2006, identified potential recycled water customers within the City based on recycled water use for large-volume irrigation purposes (e.g. municipal parks, fields, golf courses, etc.). Recycled water use factors were applied to overall water demands for these customers to determine the potential recycled water demands. A proposed recycled distribution water pipeline route was based on maximizing recycled water demands and minimizing pipeline and infrastructure costs (See Appendix M).

4.5.5 PROJECTED RECYCLED WATER USE

Section 10633
(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15 and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision

The City's "Draft Recycled Water Feasibility Study" identified potential recycled water customers within the City (e.g. municipal parks, fields, golf courses, etc.). Recycled water use factors were applied to overall water demands for these customers to determine the potential recycled water demands. A proposed recycled distribution water pipeline route was based on maximizing recycled water demands and minimizing pipeline and infrastructure costs. Although a schedule for recycled water use has not been specified in the Study, the proposed recycled water system will provide recycled water to 23 potential customers with a total annual recycled water demand of approximately 644 acre-feet per year (See Appendix M). The total potential coincident 'peak hour recycled water demand' for the 23 potential recycled water users is approximately 2,996 gallons per minute. Recycled water deliveries could begin by fiscal year 2019-2020 with the full projected amount of 644 AFY by fiscal year 2024-25 subject to availability of funding.

4.5.6 ENCOURAGING USE OF RECYCLED WATER

Section 10633
(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

The City's "Draft Recycled Water Feasibility Study" identified potential funding sources. Funding for construction, operation, maintenance, and replacement of facilities for the proposed City's recycled water distribution system will be obtained from federal, state, and local sources, including City revenues.

4.5.7 PLAN FOR OPTIMIZING USE OF RECYCLED WATER

Section 10633
(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

The City's "Draft Recycled Water Feasibility Study" identified potential recycled water customers within the City (e.g. municipal parks, fields, golf courses, etc.) and a proposed recycled distribution water pipeline route was based on maximizing recycled water demands and minimizing pipeline and infrastructure costs. The Study also identified recycled water facilities, including recycled water distribution pipelines, booster pumps, reservoirs, and backflow prevention assemblies, and identified potential funding sources for these facilities. Although the proposed recycled water project is not projected to change any land use or planning designations of the proposed recycled customers, implementation of the proposed facilities may cause temporary and/or permanent changes to the physical environment during construction. However, the Study indicates mitigation measures are available for any potential air quality, water quality, hydrology, soils, traffic, land use, and aesthetics impacts from implementation of the proposed facilities.

The City's "Draft Recycled Water Feasibility Study" identified LACSD's WNWRP as the preferred source of recycled water. The WNWRP currently supplies recycled water to Upper District's Phase IIA recycled water system. Upper District has recently completed construction of its Phase IIA recycled water system expansion into the City of Rosemead. Upper District will continue to study future recycled water expansion projects, including recycled water deliveries to the City of Arcadia.

4.5.7.1 UPPER DISTRICT GROUNDWATER REPLENISHMENT

Upper District is investigating the possibility of a potential recycled water project for groundwater replenishment that will provide recycled water for replenishment of the Main Basin of up to 10,000 acre-feet per year. The initial phase of the project will produce about 5,000 acre-feet per year for groundwater replenishment of the Main Basin. Subsequent phases will produce about an additional 5,000 acre-feet per year of recycled water for groundwater replenishment of the Main Basin.

4.6 FUTURE WATER PROJECTS

Section 10631

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water uses as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

As discussed in Section 4.1, the City's current groundwater pumping capacity in the Main Basin is approximately 18,300 gpm. The City plans to construct an additional well (City Library) between 2010 and 2015 that is projected to increase total pumping capacity to approximately 19,800 gpm. The City also has plans to construct a backup well for the Live Oak 1 well in 2015. In addition, the 2008 City of Arcadia Water Master Plan Update report identified potential reservoir, pipeline, and booster station projects, for at least 10 years into the future.

In addition to Decreed Right to the Raymond Basin and groundwater extraction from the Main Basin, the City has the ability to obtain supplemental water supplies from the following sources:

- Up to 1,591.2 AF of water stored in the Pasadena Subarea of the Raymond Basin

- Lease of Decreed Rights in the Raymond Basin. The City has historically obtained leases of up to 1,700 AFY of groundwater in the Santa Anita Subarea. The City has historically obtained leases of up to 1,600 AFY of groundwater in the Pasadena Subarea.
- Cyclic storage provisions allow producers, including the City, to store supplemental water within the Main Basin for the purpose of supplying replacement water.
- The City can receive direct deliveries of treated imported water through its MWD connection, USG-6, which has a capacity of 20 cubic feet per second (about 14,500 acre-feet per year if used continuously). The City does not typically use service connection USG-6 because the City's collective groundwater supplies are sufficient to meet water demands.

Chapter 5
WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

5.1 WATER SUPPLY RELIABILITY

5.1.1 WATER MANAGEMENT TOOLS

Section 10620(f)

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

This Plan describes water management tools and options used by the City to maximize local resources and minimize the need to import water. These include Groundwater Basin Management Structure (Chapter 4.2), Future Water Projects (Chapter 4.6), and Demand Management Measures (Chapter 6).

5.1.2 SUPPLY INCONSISTENCY

Section 10631(c)(2)

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

As a result of the Raymond Basin and Main Basin management, the City has not experienced water supply deficiencies. The management of both basins is based on their adjudications, which are described in Chapter 4.2.

5.2 WATER SHORTAGE CONTINGENCY PLANNING

5.2.1 CATASTROPIC INTERRUPTION OF WATER SUPPLIES

Section 10632
(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

The City of Arcadia's City Council has acted upon several water conservation ordinances and resolutions to prepare for water shortages. Copies of these ordinances and resolutions are available for review in the City Clerk's office located at City Hall and are briefly described below.

1. Ordinance No. 1598 adopted by the Arcadia City Council on June 21, 1977, established City policy for water conservation including power to issue a declaration of a state of urgency, prohibited uses, percentage curtailment of use, implementation of phases, penalties, adjustments, etc.

2. Resolution No. 5435 passed by the City Council on August 16, 1988, adopted a program of voluntary water conservation to reduce consumption by 10 percent.

3. Ordinance No. 1930 adopted by the City Council on February 5, 1991. Mandatory Water Conservation Plan passed as an emergency measure due to drought. Provided for a progressive surcharge schedule for multiple violations of excessive water use, and restricted certain uses of water.

4. Resolution No. 5568 passed on February 5, 1991, enacting Phase I mandatory measures and Phase 2 measures (10 percent mandatory reduction) pursuant to Ordinance No. 1930.

5. Resolution No. 5638 passed by the City Council on March 21, 1995, rescinded Phase 1 measures and restored 10 percent voluntary reduction goal pursuant to Resolution No. 5435.

6. Resolution No. 5481 passed by the City Council on March 21, 1995, rescinded Phase 1 measures pursuant to Ordinance 1930; continued 10 percent reduction goal per Resolution No. 5435.

7. Ordinance No. 2036 adopted by the City Council April 4, 1995, amended Article VII, Division 3 Part 5, chapter 5 of Arcadia Municipal Code. Phases 6, 7 and 8 were added to the original Ordinance 1930 to provide for emergency water use reductions of up to 50 percent as required by mandatory Urban Water Shortage Contingency Plan (June 1992). Also enacted City "Water Banking" program, which allows residents to carry over water conservation credits from one billing cycle to another.

8. Resolution No. 6637 passed by the City Council on August 5, 2008, authorized the Assistant City Manager / Public Works Services Director to implement a voluntary water conservation program in order to reduce water use by ten percent. In addition, the resolution determined a public campaign was to be launched regarding water shortages and voluntary water use reductions.

To further prepare for a catastrophic interruption of water supplies, the City maintains a water fund balance, commonly referred to as reserves, for the purpose of maintaining adequate funds for the replacement, repair or operation of critical water facilities in the event of a major catastrophe, such as a major power outage, earthquake or similar natural disaster. The City's Water Fund is comprised of an Operating Fund, Capital Fund and Equipment Fund.

In 1991, in accordance with the requirements of Assembly Bill 11X, the City of Arcadia developed a comprehensive Water Shortage Contingency Plan. The City also created an Emergency Response Plan consistent with guidelines prepared by the California State Office of Emergency Services.

The City recognizes the importance of Demand Management Measures (DMM) in reducing water demand and continues to implement DMM programs whether or not a shortage exists. The City of Arcadia realizes that media attention of the City's water supply is a good way of informing the public of any water supply shortages and will increase media attention and public water education programs should a water supply shortage occur.

The City also participated in a seismic reliability program and has obtained federal funding for the study that examined damage to water infrastructures resulting from a major earthquake. Funding has also become available for the design and retrofitting of various City facilities. These retrofits help "disaster proof" the City's water system and help prevent water outages because of infrastructure failure.

The following include examples of actions the City will take in preparation of a water supply catastrophe:

- Determine what constitutes a proclamation of a water shortage
- Stretch existing water shortage
- Obtain additional water supplies
- Develop alternative water supplies
- Determine where the funding will come from
- Contact and coordinate with other agencies
- Create an Emergency Response Team/Coordinator
- Create a catastrophe preparedness plan
- Put employees/contractors on call

- Develop methods to communicate with the public
- Develop methods to prepare for water quality interruptions

As mentioned earlier, the City adopted Ordinance No. 2036 in April 1995 to provide for emergency water use reductions of up to 50 percent as required by mandatory Urban Water Shortage Contingency Plan. In addition, the City Council would adopt a resolution to declare a water shortage emergency if necessary.

5.2.2 MANDATORY PROHIBITIONS

Section 10632
(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

The City of Arcadia's Mandatory Water Conservation Ordinance includes prohibitions on various wasteful water uses such a lawn watering during mid-day hours, washing sidewalks and driveways with potable water and allowing plumbing leaks to go uncorrected.

5.2.3 CONSUMPTION REDUCTION METHODS

Section 10632
(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, as appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

The City has developed an eight-stage rationing plan to invoke during declared water shortages. The rationing plan includes the following mandatory rationing,

depending on the causes, severity, and anticipated duration of the water supply shortage:

Shortage Condition	Phase	Customer Reduction Goal	Type of Rationing Program
Imminent Drought	I	10%	Mandatory
Up to 10%	II	10%	Mandatory
11 – 15%	III	15%	Mandatory
16 – 20%	IV	20%	Mandatory
21 – 25%	V	25%	Mandatory
26 – 30%	VI	30%	Mandatory
31 – 40%	VII	40%	Mandatory
41 – 50%	VIII	50%	Mandatory

Water allocations are established for all customers according to the following ranking system:

1. Average of past usage for a “base” period.
2. Health and safety allocations (includes hospitals, convalescent facilities, fire fighting and public safety).
3. Health and safety allocations (includes single family, multi-family, and retirement communities).
4. Commercial, industrial, institutional/governmental operations (where water is used for manufacturing and to maintain jobs and economic base of the community (not for landscape uses).

The City has established a “base” period as the allocation method for each of the phases of reduction. All customer types fall within this allocation method. Customers

may appeal their allotments by completing a form, which asks specific questions as to why the added allotment is necessary, and what that customer has done to conserve water before granting the allotment. The "base" period is a recent consecutive three-year period. This gives the City a more accurate view of the usual water need of each customer, allows for fluctuations in temperature and rainfall, and provides additional flexibility in determining allotments and reviewing appeals. The rationing percentage is then deducted from the customer's allotment. The allotment is specific for each of the six billing cycles to provide for more water use in warmer months and less use in cooler months, thereby reflecting seasonal patterns.

5.2.4 PENALTIES OR CHARGES FOR EXCESSIVE USE

Section 10632
(f) Penalties or charges for excessive use, where applicable.

It is unlawful and a misdemeanor for any customer to fail to comply with any provisions of the regulations and restrictions on water use set forth in the City's Mandatory Water Conservation Plan Ordinance. Violators of Phase I restricted uses will receive a written notice. A violator receiving three or more written notices is referred to the City Attorney who may proceed with filing a misdemeanor against the customer.

For the first violation of Phases II through VIII, the City will impose a surcharge penalty, in addition to the water rate, in an amount equal to two times the current water rate for those billing units used in excess of base.

For the second violation of Phases II through VIII, the City will impose a surcharge penalty, in addition to the water rate, in an amount equal to three times the current water rate for those billing units used in excess of base. The third violation increases the amount to four times the current water rate for those water units used in excess of the base allotment. For example, a customer with an overuse of 10 units of

water (10 hundred cubic feet) would pay $2.44 per unit (two times the current water rate of $1.22), or $24.40 for the first violation. The second violation would be $3.66, or $36.60 (three times the rate) and the third violation for the same amount of units would be four times the water rate ($4.88, or $48.80) added to the amount of the regular water bill.

5.2.5 REVENUE AND EXPENDITURE IMPACTS

Section 10632
(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

Revenues that the City collects are used to fund Operations and Maintenance, including the Capital Improvement and Equipment Replacement Program. Depending on the length of the drought and the possible decrease in revenue as a result, projects may have to be postponed. If a drought persisted for several years and a serious decrease in revenue occurred, the Water Fund Reserve would have to be used to keep the water system operating. The last measure to cover the revenue shortfall would be to ask the City of Arcadia's City Council to adjust the water rate.

5.2.6 DRAFT WATER SHORTAGE CONTINGENCY RESOLUTION OR ORDINANCE

Section 10632
(h) A draft water shortage contingency resolution or ordinance.

As mentioned earlier, the City adopted Ordinance No. 2036 (see Appendix N) in April 1995 to provide for emergency water use reductions of up to 50 percent as required by mandatory Urban Water Shortage Contingency Plan. In addition, the City Council would adopt a resolution to declare a water shortage emergency if necessary.

5.3 WATER QUALITY

Section 10634

The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

5.3.1 GROUNDWATER FROM MAIN BASIN

Water from the City's water system supplied from the Main Basin meets all drinking water regulations. Groundwater from the City's Longden 1 and Longden 2 wells contains concentrations of VOCs at levels exceeding CDPH standards. The City installed air stripping treatment equipment in the 1980's to remove VOCs from the groundwater produced from the Longden 1 and Longden 2 wells. Groundwater from the Longden 2 and St Joseph 2 wells contains concentrations of Nitrate at levels exceeding CDPH standards. Consequently, the City has instituted CDPH approved blend plans to reduce Nitrate and VOC concentrations to below 80 percent of CDPH standards. As a result of the City's CDPH approved treatment and blending activities, the City's wells will provide a reliable water source from the Main Basin to City customers for the next 25 years.

5.3.2 GROUNDWATER FROM RAYMOND BASIN

Water from the City's water system supplied from the Raymond Basin meets all drinking water regulations. Groundwater from the City's Orange Grove 1A and Orange Grove 5 wells contains concentrations of VOCs at levels exceeding CDPH standards. Groundwater from the Orange Grove 5 well contains concentrations of Nitrate at levels exceeding CDPH standards. Consequently, the City has a blend program to reduce Nitrate and VOC concentrations to below 80 percent of CDPH standards. As a result of the City's CDPH approved blending activities, the City's wells are expected to provide a reliable water source from the Raymond Basin to City customers for the next 25 years.

Although unanticipated changes in blending activities may result in a loss of Raymond Basin well capacity, the City can reliably produce groundwater from the Main Basin and can obtain treated imported water from USG-6 to meet demands.

5.3.3 IMPORTED WATER

The City can also receive direct delivery of treated imported water from its connection (USG-6) with MWD water supplies. Water supplied from treated imported water meets all drinking water regulations.

5.4 DROUGHT PLANNING

5.4.1 RELIABILITY OF SUPPLY AND VULNERABILITY TO SEASONAL OR CLIMATIC SHORTAGE

Section 10631(c)(1)
Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:
(A) An average water year.
(B) A single dry water year.
(C) Multiple dry water years.

As a result of the Main Basin and the Raymond Basin management, the City has not experienced water supply deficiencies. The management of both basins is based on their adjudications, which are described in Section 4.2. Based on current management practices in the Main Basin and Raymond Basin, the minimum water supplies available at the end of an average water year, a single dry year, and multiple dry years would be at least equal if not greater than the City's water demand.

Information regarding the reliability of the groundwater supplies from Main Basin and Raymond Basin is based on the 51-year rainfall data for the San Gabriel Valley (Table 2), and past data on the availability of water supply to meet demands during

seasonal or climatic shortage. Table 2 summarizes the rainfall in the San Gabriel Valley from water year 1958-59 through water year 2008-09. According to the rainfall data for the San Gabriel Valley, the annual average rainfall is 17.8 inches. Therefore, water year 2005-06 (or fiscal year 2005-06) represents an average water year for the City in which the total amount of rainfall was about 16.8 inches. A single dry year for the City was represented in water year 2006-07 (or fiscal year 2006-07) in which the total amount of rainfall was about 4.9 inches. A multiple dry year sequence for the City is represented from water year 2006-07 to water year 2008-09 (or from fiscal years 2006-07 to 2009-09), where the total amount of rainfall was about 4.9 inches, 16.4 inches, and 14.0 inches, respectively. Table 9 shows that during an average year, single dry year and multiple dry years, groundwater production for the City remained stable. A dry year or multiple dry years did not compromise the City's ability to provide a reliable supply of water to its customers.

Based on current management practices, the City will be able to rely on the Main Basin and the Raymond Basin for adequate supply over the next 25 years under single year and multiple year droughts.

5.4.2 STAGES OF ACTION IN RESPONSE TO WATER SUPPLY SHORTAGES

Section 10632
(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

As the water purveyor, the City must provide the minimum health and safety water needs of the community at all times. The water shortage response is designed to provide a minimum of 50 percent of the normal supply during a severe or extended water shortage. The rationing program triggering levels shown in Appendix O were established to ensure that this goal is met.

Although an actual shortage may occur at any time during the year, a shortage (if one occurs) is usually forecasted by local agencies such as MWD, State Department of Water Resources, Main Basin Watermaster and Raymond Basin Management Board.

The City's potable water sources are groundwater and imported water (when the City's allotment is over pumped in the Main Basin). Rationing phases may be triggered by a supply shortage or by contamination in one source or a combination of sources.

5.4.3 THREE YEAR MINIMUM WATER SUPPLY

Section 10632
(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

Over the past 20 years, the driest three-year sequence (multiple dry years) in the City's service area occurred from water year 2006-07 (or fiscal year 2006-07) to water year 2008-09 (or fiscal year 2008-09), as shown in Table 2. The ratio between the normal water year in 2005-06 (or fiscal year 2005-6) and multiple dry years (or fiscal years 2006-07 to 2008-09) was estimated for the City's supply, as shown on Table 11. This ratio from Table 11 was used to estimate the minimum water supply available during each of the next three water years based on the driest three-year historical sequence for the City's water supply (see Table 12).

5.4.4 WATER USE REDUCTION MEASURING MECHANISM

Section 10632
(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Under normal water supply conditions, potable water production figures are recorded daily during business hours and on the first day of the month. Totals are quantified on a monthly basis. Before returning to any phase of the Mandatory Water Conservation Plan, the City Council would have to be advised of a water shortage well in advance of approving any phase of the Mandatory Water Conservation Plan. The Director of Public Works Services would keep the City Manager advised on a weekly basis if there was a water shortage and he in turn would brief the City Council. Reports would have to be made at public meetings of the City Council.

5.4.5 ASSESSMENT OF THE RELIABILITY OF WATER SERVICE

Section 10635

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry year water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

As previously discussed in Chapter 3.2, the City applied SBX7-7 to estimate the City's 2015 Interim Urban Water Use Target of 265 GPCD and the City's 2020 Urban Water Use Target of 236 GPCD. These Urban Water Use Targets were then applied to estimate the City's projected normal year demands in 2015, 2020, 2025, 2030, and 2035, as shown on Table 6. The City will continue to use groundwater as its main source of water supply over the next 25 years. The following sections discuss the City's water service reliability assessment, which compares the City's supply and demand over the next 25 years during normal, dry and multiple dry years.

5.4.5.1 NORMAL WATER YEAR

As previously discussed, the City's projected normal water year demand over the next 20 years in five-year increments was based on the City's 2015 and 2020 Urban Water Use Targets of 265 GPCD and 236 GPCD, respectively. The City's projected supply was based on the projected demand, as shown on Table 8. The comparison of the City's projected supply and demand during a normal water year is shown on Table 13. As shown on Table 13, the City's supply can meet demands during a normal water year for the next 25 years.

5.4.5.2 SINGLE-DRY YEAR

As shown on Table 2, the City experienced a single-dry year during fiscal year 2006-07 and a normal water year during fiscal year 2005-06. The ratio between the normal water year and single-dry year was estimated for the City's supply and demand, as shown on Table 11. This ratio and the projected supply and demand during a normal water year from Table 13 was used to estimate the City's projected supply and demand during a single-dry year over the next 25 years in five-year increments. The comparison of the City's projected supply and demand during a single-dry year is shown on Table 14. As shown on Table 14, the City's supply can meet demands during a single-dry year for the next 25 years.

5.4.5.3 MULTIPLE DRY YEARS

As shown on Table 2, the City experienced multiple dry years during fiscal years 2006-07, 2007-08 and 2008-09. The ratio between the normal water year in 2005-06 and multiple dry years were estimated for the City's supply and demand, as shown on Table 11. This ratio and the projected supply and demand during a normal water year from Table 13 was used to estimate the City's projected supply and demand during multiple dry years over the next 25 years in five-year increments. The comparison of

the City's projected supply and demand during multiple dry years is shown on Table 15. As shown on Table 15, the City's supply can meet demands during multiple dry years for the next 25 years.

5.4.5.4 GROUNDWATER RELIABILITY

The City obtains its water supply from groundwater wells, located in the Raymond Basin and the Main Basin, and from imported treated water. Chapter 4 provides a description of the management of water resources in the Raymond Basin and Main Basin, as well as information on basin management. Chapter 4 also demonstrates the management structure of the Main Basin provides a reliable source of groundwater supply for the City in an average, single-dry and multiple-dry water years. Historical data indicate the Raymond Basin and Main Basin have been well managed for over 40 years of adjudication The City will be able to rely on the Raymond Basin for water supply over the next 25 years under single year and multiple year droughts. There are no contemplated basin management changes, other than the planned use of recycled water for groundwater replenishment in the Main Basin. Therefore, based on historical and on-going management practices, the City will be able to rely on the Main Basin for adequate supply over the next 25 years under single year and multiple year droughts.

Chapter 6
DEMAND MANAGEMENT MEASURES

The City is committed to implementing water conservation programs and works collaboratively with Upper District to provide water conservation programs for its residents. As a member of Upper District, the City's residents have the benefit of participating in Upper District's conservation efforts. Upper District offers an extensive program throughout the San Gabriel Valley and is a signatory to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and is therefore a member of the California Urban Water Conservation Council (CUWCC). Although the City did not sign the MOU regarding Urban Water Conservation in California and is not a member of the CUWCC, the City takes advantage of its relationship with Upper District as a member agency. The following sections describe the City's implementation of the Demand Management Measures (DMMs) required in the UWMP Act.

6.1 DEMAND MANAGEMENT MEASURES BEING IMPLEMENTED

Section 10631

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

6.1.1 WATER SURVEY PROGRAMS FOR SINGLE-FAMILY RESIDENTIAL AND MULTIFAMILY RESIDENTIAL CUSTOMERS [10631(F)(1)(**A**)]

The City monitors customer's water use through its computerized billing system. The City's billing system automatically audits customer's water bills and flags those bills that show unusual or high consumption. The City's billing system alerts the City when a customer's bill is flagged for high consumption and a customer can make a request to have a service representative inspect their system to make necessary repairs. In addition, City staff can review water usage bills to determine if "excessive water use" occurred and can help customers individually determine the reason for the "excessive water use. The City is currently preparing a procedure for documenting service calls, surveys and their corresponding water savings through its Customer Service group. Estimated savings are expected to be 3 to 150 gallons per day per customer.

Upper District encourages its member agencies, including the City, to implement water survey programs. Additionally, Upper District supports its member agencies' efforts by offering workshops to train staff on how to conduct residential water surveys.

6.1.2 RESIDENTIAL PLUMBING RETROFIT [10631(F)(1)(**B**)]

The City, in conjunction with Upper District, participates in a residential plumbing retrofit program. Upper District's residential plumbing retrofit program is through MWD.

MWD distributes residential plumbing retrofits, Ultra –Low Flush Toilets (ULFT) and high-efficiency clothes washers, to its member agencies. As a member agency of MWD, Upper District receives residential plumbing retrofits and distributes them to its member agencies. The distribution of the toilets within Upper District's service area is conducted at local schools within San Gabriel Valley.

The City also implements additional residential plumbing retrofit programs. When City staff issues building permits for new or remodeled homes or other facilities, City staff enforces Chapter 4 of the Uniform Building Code that applies to Water Conserving Fixtures and Fittings.

In addition, Upper District's residential plumbing retrofit program consist of rebate programs for high- efficiency clothes washer, high-efficiency toilets, rotating nozzles for sprinklers, weather-based irrigation controllers, and synthetic turf. Information and water conservation savings regarding these programs are located in MWD's draft 2010 Regional Urban Water Management Plan (RUWMP) which is incorporated by reference.

6.1.3 SYSTEM WATER AUDITS, LEAK DETECTION, AND REPAIR [10631(F)(1)(**C**)]

The City has installed radio frequency read meters and is continuing to install radio frequency read meters. The City repairs leaks within its distribution system on an as needed basis. The City closely monitors its water production and consumption use tabulating the amount of "unaccounted for water". The City's current estimated "unaccounted for water" is approximately 10 percent. The City calculates the amount of "unaccounted for water" by finding the difference between the amount of water the City pumped and the amount of water sold to its customers. This program is effective in maintaining distribution systems that deliver water effectively and efficiently with the least amount of water loss. The amount of water conserved through the City's system water audits, leak detection and repair program can be estimated by evaluating the

average amount of “unaccounted for water”. For the period of 2005 to 2010, the average unaccounted for water has dropped from 160 milion gallons (MG) per year to 4 MG for an annual savings of $230,000 annually.

Upper District is a member agency of MWD which conducts various system audits and leak detection program for MWD’s entire system. Additional information regarding system water audits, leak detection, repair, and water conservation savings can be found in MWD's draft 2010 RUWMP, which is incorporated by reference.

6.1.4 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS [10631(F)(1)(**D**)]

The City is fully metered for all customer sectors, including separate meters for single-family residential, multifamily residential, commercial, institutional and governmental facilities. Furthermore, within the City if there is new development, each facility is individuality metered. Service charges for the City are based on the customer’s connection size. Chapter 6.1.10 provides greater detail about the City’s service fees and conservation pricing. The City’s system effectively promotes water conservation by being completely metered. Water lost through unmetered use is included in “unaccounted for water”. For the period of 2005 to 2010, the average unaccounted for water has dropped from 160 MG per year to 4 MG for an annual savings of $230,000 annually.

6.1.5 LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES [10631(F)(1)(**E**)]

The City installs state-of-the-art irrigation systems in all new public projects constructed within the City and encourages the use of irrigation systems for private projects. The City uses “cal-sense” controllers that are computer based with automatic shut off in case of an excessive flow of water. The Santa Anita Golf Course utilizes an irrigation system that allows more efficient use of water on the course. In addition, the City of Arcadia’s Code of Ordinances include landscaping regulations intended to conserve water. To further promote water conservation and more efficient use of water on large landscape areas, the City considered the use of synthetic turf and has installed synthetic turf at the City’s Civic Center Athletic Field.

The City’s large landscape conservation and incentives program is effective at conserving water because the irrigation systems installed by the City only use water as needed, therefore, the irrigation systems eliminate water waste. The City currently budgets $26,000 annually for water conservation upgrades to City medians and facility landscapes.

In addition, Upper District's large landscape conservation program includes the Sythetic Turf Grant School Program. The goal of the Sythetic Turf Grant School Program is to assist schools with funding for retrofitting large landscape areas with synthetic turf. Through this program, Upper District offers grants of up to $75,000 per site to assist with the cost of installing sythetic turf. Since the start of the program in fiscal year 2005-06, five schools have participated in this program. Based on estimated service life of 10 years for synthetic turf, the total annual water savings for the 5 synthetic turf programs is estimated at 53 acre-feet.

6.1.6 HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAMS [10631(F)(1)(**F**)]

The City does not currently implement its own high-efficiency washing machine rebate program because it is not economically viable. However, the City does participate in a high-efficiency washing machine program through its relationship with Upper District. Upper District in partnership with MWD, DWR, CalFed Bay Delta Program and the U.S. Bureau of Reclamation, offers a residential high-efficiency clothes washer rebate program. Residential customers within Upper District's service area (including the City) can install a high-efficiency washing machine in place of standard-efficiency washing machine for a rebate. This program allows the City's customers to benefit from a high-efficiency washing program and contributes to the conservation of water.

Moreover, Upper District, in partnership with MWD, State Department of Water Resources, CalFed Bay Delta program and the U.S. Bureau of Reclamation, offers a residential high-efficiency clothes washer rebate program. Residential dwellings (single-family homes, condominiums, townhouses, apartments or mobile homes) that are located within Upper District's service area can install a high-efficiency washing machine in place of standard-efficiency washing machine for a rebate. A residence that installs a high-efficiency washing machine could receive a rebate of $200 per washer as of fiscal year 2008-09. The program began in fiscal year 2002-03. Since the program began, a total of 6,656 rebates have been provided. Metropolitan states that this program saves about 10,000 gallons per year per washer over a conventional top loading washer. Based on an estimated service life of 15 years for each washer, the total annual water savings for 6,656 washers is estimated at 160 acre-feet. Additional information on the high-efficiency washing machine rebate program can be found in Upper District's 2010 Plan, incorporated by reference.

6.1.7 PUBLIC INFORMATION PROGRAMS [10631(F)(1)(**G**)]

The City informs City of Arcadia residents about water conservation through its public information programs. The City has a quarterly newsletter that is sent to the City's customers/residents, which provides information about water conservation on a seasonal basis. The City also prints water conservation messages periodically on its customer's water bills. In addition, the City's new "Hot Sheet", which is mailed with the City's water bills (a two-sided, one-page leaflet), is also used to remind residents of useful water conservation tips, purposely focused on a monthly basis either on indoor or outdoor conservation practices. Lastly, the City's website located at http://www.ci.arcadia.ca.us/home/index.asp contains additional useful information.

As a member of Upper District, the customers of the City can also receive public information about water conservation through Upper District's various public information programs. Upper District offers conservation brochures, posters, activity booklets, public outreach display and workshops. Upper District also raises awareness about water conservation through paid advertising, press releases, news ads and media events.

Each year, the Upper District hosts its annual Water Fest event, in which the City has participated in since 2003. Each fall, Upper District holds this community event to promote water conservation on every level; targeted towards area residents, business owners and visitors alike. A well attended day, this effort has proven to draw thousands of eager visitors who are able to peruse the many booths, participate in children's games, as well as win conservation related raffle prizes and receive a wealth of literature and give-away items to assist them in their water conservation practices.

To ensure that an abundant supply of water conservation information is provided to the City of Arcadia residents, the City hosts Concerts in the Park, the Summer Reading Program Kick Off, and the Community Picnic where amongst other activities,

the Public Works Services staff talks with residents and hands out countless environmental pieces and give-aways – much of which focused on water-wise practices and water conservation. The City also publishes an annual calendar for its residents, with the theme for both 2005 & 2006, focusing on environmental topics, of which, water conservation is highlighted. Calendars are mailed to residents in December.

Furthermore, the City has joined forces with the Los Angeles County to participate in the annual LA County Environmental Education Fair (LAEEF), held at the Arboretum which is located in the City of Arcadia. Again, manning booths and speaking with area residents, school-age children and educators alike – City staff is able to continue its dissemination of water conservation information and related take home items, The City currently budgets $8,000 annually for the promotion and education of water conservation.

In addition, Upper District promotes water conservation through its many public information programs. Upper District offers conservation brochures and posters, activity booklets, public outreach displays, oral presentations, and workshops to inform the public of conservation efforts. Upper District also raises awareness about water conservation through paid advertising, press releases, news ads, media events, and through the Speaker's Bureau. Annually, Upper District hosts a water awareness festival (Water Fest) to raise public awareness about water conservation, water quality, and other water-related issues. Water conservation savings are not available for this DMM. Additional information regarding Upper District's public information programs can be found in Upper District's 2010 Plan.

6.1.8 SCHOOL EDUCATION PROGRAMS [10631(F)(1)(**H**)]

The customers of the City or Arcadia also receive educational tools regarding water conservation through Upper District’s school educational programs. Upper

District's school educational programs include an annual Water Awareness Youth Art Contest, combining an art poster contest for grades K though 3rd and 4th though 6th and a T-shirt contest for grades 7th through 12th. Winning artwork graces the Upper District's custom water bottle labels, as well as promotional stickers that are handed out at community events. Printed materials can be provided to schools within Upper District's service area (including the City). Upper District's educational materials and presentations meet state education framework requirements.

In addition, Upper District directly offers school education programs in an effort to raise awareness of water issues. Upper District started its school education programs in September 1992 and the materials and presentations meet state education framework requirements. The following is a list of Upper District's school educational programs:

- Water Awareness Art Contests
- Solar Cup Competition
- Water Education Grant Program
- Annual Art Poster Contest for grades K through 3rd and 4th through 6th
- T-shirt Art Contest for grades 7th through12th
- Water Educational Posters
- Water Resource Library

Upper District also participates in additional educational school programs through MWD, which has extensive educational programs that includes schools within Upper District's boundaries. MWD's educational programs meet state education framework requirements. A list of MWD's school education programs and water conservation savings is included in MWD's draft 2010 RUWMP, which is incorporated by reference.

6.1.9 CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL ACCOUNTS [10631(F)(1)(**I**)]

As shown on Table 5, the City currently has approximately 820 commercial meter accounts, most of which are office buildings and small shops. The City participates in a commercial and industrial water conservation program through Upper District's Commercial, Industrial and Institutional (CII) Program. Upper District in conjunction with MWD offers rebates for retrofitting certain high water-use fixtures/equipment with more water efficient models. Eligible fixtures included in Upper District's CII Program include:

Fixture	Rebate
Ultra Low Flush Toilets (ULFT)	up to $180
ULF Urinals	up to $100
Flush Valve Retrofit Kit	up to $25
Automatic Faucet Shut-off Valve	up to $80
Coin or Card Operated High-Efficiency Clothes Machine	up to $450
Cooling Tower Conductivity Controller – Replacement or New Installation	up to $700
Hospital X-Ray Processor Recirculating System	up to $3,000
Water Pressurized Broom	up to $150

This program effectively conserves water by replacing regular efficiency machines with high-efficiency equipment, which ultimately reduces the amount of water used.

Likewise, Upper District offers a conservation program for CII facilities. Upper District's program offers CII facilities rebates for retrofitting existing high water-use fixtures with efficient water-use fixtures. The CII program includes the following fixtures:

1. Commercial High Efficiency Toilet (includes flushometer, tank, and dual flash)

2. Commercial High Efficiency Toilet (new construction)
3. Ultra Low Water Urinal (less than 0.25 gallons per flush (gpf) and Zero Water Urinals
4. Ultra Low Water Urinal and Zero Water Urinals Upgrade or New Construction
5. Water Broom
6. Connectionless Food Steamer
7. Ice Making Machine Tier III standard
8. Dry Vacuum Pump
9. Cooling Tower Conductivity Controller
10. pH Cooling Tower Controller
11. Weather-Base Irrigation Controller and Central Computer Irrigation Controller
12. Rotating Nozzles for Pop-up Spray Head Retrofits
13. Large Rotary Nozzles

The program began in fiscal year 2000-01. A total of 10,568 rebates have been received through this program. Based on an estimated weighted service life of 19 years for CII rebate programs items, the total annual water savings for the 10,568 rebate program items is estimated at 490 acre-feet.

6.1.10 CONSERVATION PRICING [10631(F)(1)(**K**)]

The City's Mandatory Water Conservation Program, as outlined in its Municipal Code, contains penalties for overuse of water during drought times that are based on the various stages enacted upon by resolutions passed by the Arcadia City Council.

In addition the City's Cyclic Storage account is a form of conservation pricing. The recently implemented Long-term Cyclic Storage program allows retail agencies to purchase untreated imported water at a reduced rate to store in Main Basin for a period of up to five years. The stored water creates a drought reserve that can be utilized to

mitigate future imported water supply shortages. This program helps water utilities meet their potential future water demands by pre-purchasing and storing imported water that they can later use to supplement existing groundwater supply. The City has participated in this program during fiscal year 2009-10.

In 2010 the City prepared a Tiered Water Rate Study intended to analyze the current water use and billing practices and to provide recommendations for a tiered water rate structure that would provide a conservation incentive, ensure financial stability and meet the regulatory requirements of SBX7-7. At the time of this report no decision has been reached as to the acceptance of, or appropriate implementation of a tiered water rate structure.

In addition, Upper District implements conservation pricing to encourage sub-agencies to conserve water. Additional information regarding Upper District's conservation pricing can be found in its 2010 Plan incorporated by reference.

6.1.11 WATER CONSERVATION COORDINATOR [10631(F)(1)(**L**)]

The City's Environmental Services Officer is responsible for all aspects of environmental issues including water conservation measures for residents and business owners alike. The City's Environmental Services Officer coordinates public water awareness materials, public outreach events, speaks with residents/business owners who contact the City for water conservation information and participates in the active dissemination of Upper District efforts such as the High Efficiency Clothes Washer Rebate Program.

In addition as a member of Upper District, the City can utilize Upper District's water conservation coordinator, who is employed by Upper District to promote water conservation issues and programs within Upper District's service area including the

City. The water conservation coordinator does research on water management practices and advises retail water purveyors on water conservation matters. Upper District's water conservation coordinator is effective at informing the public on water awareness and is involved in public information programs and school education programs.

The water conservation coordinator employed by Upper District promotes water conservation issues and programs. The position was created in 1992 as a full-time position. The water conservation coordinator does research on water managements practices and advises the Upper District Board Members and its subagencies, including the City, on water conservation matters. More information about Upper District's conservation coordinator can be found in its 2010 Plan, which is incorporated by reference.

6.1.12 WATER WASTE PROHIBITION [10631(F)(1)(**M**)]

The City has adopted several Ordinances and Resolutions that address the issue of water waste, and conservation measures (by % reduction), during times of decided drought by action of the City Council. These ordinances are listed in Chapter 5.2.1 of this report and are available for review at the City Clerk's Office. In addition, the City's service crews and meter readers report all wasteful uses of water, and residents are contacted regarding leaks and significant sprinkler run-off.

Furthermore, Upper District passed Resolution 6-90-266 in 1990 to reduce water demands within Upper District's service area. In addition, Upper District has prepared a draft Urban Water Shortage Contingency Resolution that may be adopted in case of an emergency which will require mandatory reductions in water use within Upper District's service area. Water conservation savings are not available for this DMM.

6.1.13 RESIDENTIAL ULTRA-LOW FLUSH TOILET REPLACEMENT PROGRAMS [10631(F)(1)(**N**)]

As mentioned in Chapter 6.1.2, Upper District in partnership with MWD conducts an ULFT Retrofit Program on behalf of the City. Residents are encouraged to replace existing high flow volume toilets with Ultra Low Flow toilets by receiving a rebate for their retrofit. MWD offers a rebate of $60, with local agencies having the ability to offer an extended rebate if feasible. Older toilet models use approximately 3.5 gallons of water per flush, with the new ULFT models using only 1.6 gallons or less per flush.

Upper District provides High Efficiency Toilets (HETs) for free to qualifying residents. The cost of the HET is funded by Upper District and MWD. MWD can only provide funding for High HETs (1.28 gallons per flush or less), which use 20 percent less than Ultra-Low Flush Toilets (ULFTs) (1.6 gallons per flush). A total of 26,960 HETs/ULFTs have been provided through this program since in first began in fiscal year 1992-93. Based on an estimated service life of 20 years for each HET, the total annual savings for the 26,960 HETs/ULFTs is estimated at 1,005 acre-feet. More information regarding the residential ultra-low-flush toilet replacement program is located in MWD's 2010 RUWMP, which is incorporated by reference.

6.2 DEMAND MANAGEMENT MEASURES NOT IMPLEMENTED

Section 10631

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and non-economic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

6.2.1 WHOLESALE AGENCY PROGRAMS [10631(F)(1)(**J**)]

The City is a retail water supplier therefore cannot implement wholesale agency programs. However, as a member of Upper District, the City participates in Upper District's wholesale agency programs.

Chapter 7

COMPLETED URBAN WATER MANAGEMENT PLAN CHECKLIST

A completed Plan checklist, with page information indicating where the required element can be found within the Plan, is provided in Appendix P.

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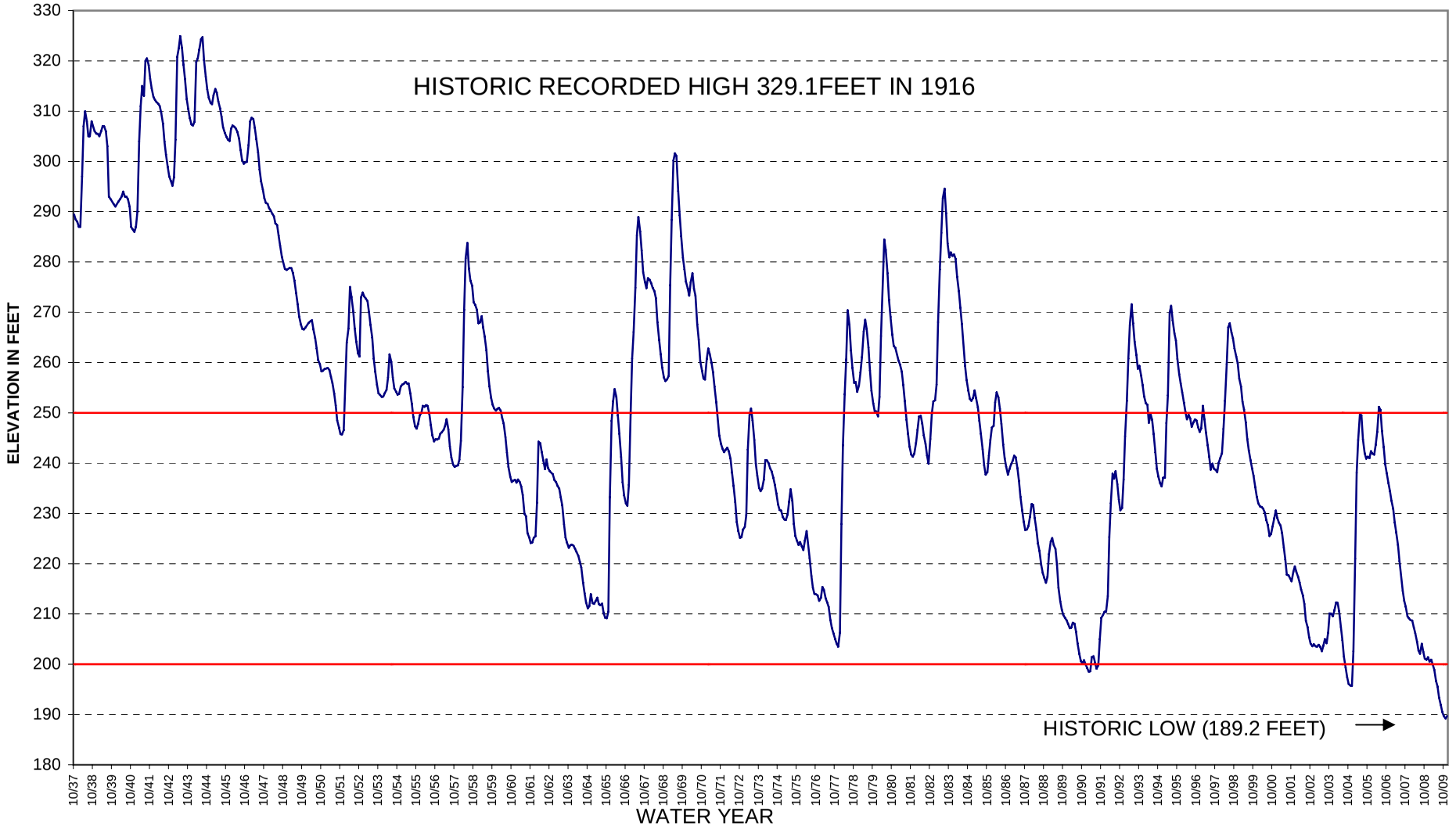
FIGURES



STETSON ENGINEERS INC.

Covina San Rafael Mesa, Arizona

WATER RESOURCE ENGINEERS

CITY OF ARCADIA

HISTORICAL BALDWIN PARK KEY WELL ELEVATION

FIGURE 1

Z:\Jobs\2343\Figures\Figure 1 Key Well Elevation

TABLES

TABLE 1
COORDINATION WITH APPROPRIATE AGENCIES

Agencies	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intent to Adopt	Not Involved/ No Information
Main San Gabriel Basin Watermaster						X	
Raymond Basin Management Board						X	
Upper San Gabriel Valley Municipal Water District				X		X	
City of Arcadia City Clerk's Office				X		X	
County of Los Angeles Registrar / Recorder						X	
City of Monrovia						X	
City of Pasadena Water & Power Department						X	
City of Sierra Madre						X	
East Pasadena Water Company						X	
Golden State Water Company						X	
San Gabriel Valley Water Company						X	
Sunny Slope Water Company						X	

TABLE 2

ANNUAL RAINFALL IN THE SAN GABRIEL VALLEY
FROM 1958-59 THROUGH 2008-09*

WATER YEAR	RAINFALL IN INCHES
1958-59	8.5
1959-60	10.6
1960-61	5.9
1961-62	22.4
1962-63	12.3
1963-64	9.4
1964-65	15.2
1965-66	19.6
1966-67	25.0
1967-68	15.0
1968-69	30.5
1969-70	11.1
1970-71	13.3
1971-72	8.5
1972-73	22.4
1973-74	16.8
1974-75	14.9
1975-76	12.1
1976-77	14.5
1977-78	38.4
1978-79	23.9
1979-80	34.8
1980-81	10.3
1981-82	18.9
1982-83	39.3
1983-84	10.6
1984-85	14.6
1985-86	22.0
1986-87	9.1
1987-88	14.9
1988-89	11.2
1989-90	12.4
1990-91	15.1
1991-92	22.8
1992-93	35.9
1993-94	11.6
1994-95	30.4
1995-96	15.6
1996-97	17.5
1997-98	36.1
1998-99	8.6
1999-00	14.4
2000-01	15.5
2001-02	6.4
2002-03	19.4
2003-04	12.7
2004-05	45.3
2005-06	16.8
2006-07	4.9
2007-08	16.4
2008-09	14.0
TOTAL	**907.8**
51-YEAR AVERAGE	**17.8**

*Annual rainfall determined as the average of rainfall at San Dimas (station 95), Pomona† (station 356C), El Monte (station 108D), and Pasadena (station 610B).

†Pomona (station 356C) replaced Walnut (station 102D) in 2000-01.

Table 3
Climate

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Rainfall (in.)	3.6	5.5	1.9	1.2	0.5	0.1	0.0	0.0	0.2	1.0	1.4	2.4	17.8
Average Temperature (^{0}F)	54	54	56	59	61	69	72	77	76	70	61	57	63.8
Evapotranspiration (in.)	2.2	2.8	4.0	5.1	5.9	6.6	7.4	6.8	5.7	4.0	2.7	1.9	55.1

Source: Rainfall data from average of four LA County Department of Public Works rainfall stations. Temperature data from www.city-data.com for San Gabriel Valley. Evapotranspiration data from California Irrigation Management Information System.

TABLE 4
CURRENT AND PROJECTED POPULATION

Fiscal Year	Population within the City's Service Area	Percent Average Annual Increase of the Population within the City
2004-05	53,677	--
2009-10	54,504	0.31
2014-15	55,506	0.37
2019-20	56,508	0.36
2024-25	57,510	0.35
2029-30	58,512	0.35
2034-35	59,514	0.34

Source: Based on May 2010 Draft Water Supply Assessment prepared for the City of Arcadia's General Plan Update. Population projections were based on data obtained from the Southern California Association of Governments (SCAG). The SCAG data incorporates demographic trends, existing land use, general plan land use policies, and input and projections from the Department of Finance (DOF) and the US Census Bureau.

TABLE 5
PAST, CURRENT, AND PROJECTED WATER DELIVERIES

Fiscal Year	Description	Water Use Sectors							System Losses	Total
		Single Family Residential	Multi Family Residential	Commercial	Industrial	Landscape Irrigation	Institutional / Governmental	Sub Total		
2004-05	No. of Metered Accounts	8,990	946	610	0	179	142	10,867		10,867
	Metered Deliveries (AF)	9,460	2,271	2,353	0	419	769	15,272	658	15,930
2009-10	No. of Metered Accounts	11,388	1,094	818	0	223	142	13,665		13,665
	Metered Deliveries (AF)	8,575	1,914	1,993	0	622	592	13,695	2,102	15,798
2014-15	No. of Metered Accounts	11,478	1,128	824	0	259	144	13,833		13,833
	Metered Deliveries (AF)	9,232	2,142	2,224	0	533	697	14,828	1,648	16,475
2019-20	No. of Metered Accounts	11,568	1,163	831	0	295	146	14,002		14,002
	Metered Deliveries (AF)	8,354	1,938	2,013	0	482	631	13,418	1,491	14,909
2024-25	No. of Metered Accounts	11,659	1,199	837	0	331	148	14,173		14,173
	Metered Deliveries (AF)	8,502	1,973	2,049	0	491	642	13,656	1,517	15,173
2029-30	No. of Metered Accounts	11,750	1,236	843	0	367	150	14,347		14,347
	Metered Deliveries (AF)	8,650	2,007	2,084	0	499	653	13,894	1,544	15,438
2034-35	No. of Metered Accounts	11,843	1,274	850	0	403	152	14,522		14,522
	Metered Deliveries (AF)	8,799	2,041	2,120	0	508	664	14,132	1,570	15,702

AF = Acre-Feet

Number of metered accounts and deliveries for 2005 and 2010 were based on information provided by City of Arcadia

Projected number of metered accounts from 2015 to 2035 were based on average projected annual percentage increase in metered accounts from the 2005 Arcadia UWMP.

Project deliveries from 2015 to 2035 were based on Arcadia's Demands (See Table 8), average percent use within customer classes, and 10 percent system losses (average losses between 2006 and 2010)

TABLE 6
HISTORICAL AND PROJECTED WATER DEMAND
(ACRE-FEET)

Fiscal Year	Total Demands [1]	Metered Deliveries [2]	Unaccounted Use [3]	Projected Water Demand for Lower Income Households [4]	Urban Water Use Target [5] (GPCD)
2004-05	15,930	15,272	658		
2005-06	16,785	15,715	1,070		
2006-07	18,668	17,610	1,058		
2007-08	17,524	15,516	2,008		
2008-09	16,763	14,726	2,037		
2009-10	15,798	13,695	2,102		
2014-15	16,475	14,828	1,648	3,116	265
2019-20	14,909	13,418	1,491	2,470	235
2024-25	15,173	13,656	1,517	2,870	235
2029-30	15,438	13,894	1,544	2,920	235
2034-35	15,702	14,132	1,570	2,970	235

[1] See Table 7 for 2005 to 2010 demands; Projected water demands based on Urban Water Use Target and populations (Table 4).
[2] See Table 5
[3] Historical unaccounted use is equal to demand minus delivery ; Projected unaccounted use is based on 10 percent system losses (from 2006 to 2010)
[4] Included in "Total Demands" ; Lower income demands are approximately 27.4 percent of total residential demands
[5] See Chapter 3.2.2 and 3.2.3 for urban water use target and interim urban water use target, respectively

TABLE 7
CALCULATION OF BASELINE DAILY PER CAPITA WATER USE

Fiscal Year	Total Water Supply (Excluding Recycled Water (in Service Area (AF)	Calculated Gross Water Use (gallons per day)	Population within City's Service Area[1]	Calculated Daily per Capita Use (gpcd)	Average Per Capita Water Use	
					10-Year Continuous[2] (gpcd)	5-Year Continuous[3] (gpcd)
1995-96	16,727	14,932,880	48,645	307		
1996-97	17,279	15,425,703	49,102	314		
1997-98	15,079	13,461,822	49,560	272		
1998-99	16,053	14,331,107	50,017	287		
1999-00	17,879	15,961,226	50,474	316		
2000-01	17,183	15,340,116	50,932	301		
2001-02	17,014	15,188,983	51,768	293		
2002-03	16,701	14,909,598	52,604	283		
2003-04	18,057	16,120,224	53,440	302		
2004-05	15,930	14,221,629	53,677	265	294	
2005-06	16,785	14,984,499	53,914	278	291	
2006-07	18,668	16,665,344	53,977	309	291	
2007-08	17,524	15,644,372	54,040	289	292	289
2008-09	16,763	14,965,341	54,104	277	291	284
2009-10	15,798	14,103,430	54,504	259	286	282

10-Year Baseline Daily Per Capita Water Use= 294 gallons per capita per day.[4]
5-Year Baseline Daily Per Capita Water Use= 289 gallons per capita per day.[5]

[1] Based on data from the Southern California Association of Governments, Department of Finance, and US Census Bureau
[2] Average per capita water use for first base period of 10-year continuous, ending no earlier than December 31, 2004 and no later than December 31, 2010.
[3] Average per capita water use for second base period of 5-year continuous, ending no earlier than December 31, 2007 and no later than December 31, 2010.
[4] Highest value calculated for a 10-year continuous period between 1995 and 2009.
[5] Highest value calculated for a 5-year continuous period between 2004 and 2009.

TABLE 8
PROJECTED WATER DEMANDS BASED ON URBAN WATER USE TARGETS
(ACRE-FEET)

Fiscal Year	Population within City's Service Area [1]	Urban Water Use Target [2] (gpcd)	Total Demands (gpd)	Total Demands (AF)
2014-15	55,506	265	14,687,517	16,452
2019-20	56,508	235	13,291,251	14,888
2024-25	57,510	235	13,526,932	15,152
2029-30	58,512	235	13,762,612	15,416
2034-35	59,514	235	13,998,293	15,680

[1] See Table 4
[2] See Table 7

TABLE 9
HISTORICAL AND PROJECTED WATER SUPPLIES (NORMAL YEAR)
(ACRE-FEET)

Fiscal Year	Groundwater Supplies					Imported Water Supplies	Recycled Water Supplies	Total [1]
	Main Basin	Raymond Basin [2]	Groundwater Delivered by the City of Arcadia to the City of Sierra Madre [3]	Sub Total Groundwater	Percentage Groundwater of Total Supply	MWD [4]		
Historical								
1994-95	7,863	7,437	0	15,300	100.0%	0	0	15,300
1995-96	11,215	5,512	0	16,727	100.0%	0	0	16,727
1996-97	10,176	7,103	0	17,279	100.0%	0	0	17,279
1997-98	9,328	5,751	0	15,079	100.0%	0	0	15,079
1998-99	8,737	7,315	0	16,053	100.0%	0	0	16,053
1999-00	11,696	6,183	0	17,879	100.0%	0	0	17,879
2000-01	11,161	6,022	0	17,183	100.0%	0	0	17,183
2001-02	11,418	5,596	0	17,014	100.0%	0	0	17,014
2002-03	12,153	4,548	0	16,701	100.0%	0	0	16,701
2003-04	12,439	5,078	0	17,516	97.0%	541	0	18,057
2004-05	10,002	6,176	(247)	15,930	100.0%	0	0	15,930
2005-06	9,230	7,609	(54)	16,785	100.0%	0	0	16,785
2006-07	12,286	6,382	0	18,668	100.0%	0	0	18,668
2007-08	12,686	4,811	(68)	17,429	99.5%	95	0	17,524
2008-09	10,780	4,584	0	15,364	91.7%	1,399	0	16,763
2009-10	11,478	4,034	0	15,512	98.2%	286	0	15,798
Projected (Normal Year)								
2014-15	11,443	5,009	0	16,452	100.0%	0	0	16,452
2019-20	9,579	5,009	0	14,588	98.0%	0	300	14,888
2024-25	9,499	5,009	0	14,508	95.7%	0	644	15,152
2029-30	9,763	5,009	0	14,772	95.8%	0	644	15,416
2034-35	10,027	5,009	0	15,036	95.9%	0	644	15,680

[1] See Table 8 for total projected normal year demands

[2] Raymond Basin supplies include 30 percent reduction over five years for all Decreed Rights to the Pasadena Subarea beginning fiscal year 2009-10. Projected Raymond Basin supplies include 1,482.6 AfY from the Pasadena Subarea and 3,526.0 AFY from the Santa Anita Subarea.

[3] Groundwater pumped by the City of Arcadia and delivered to the City of Sierra Madre for Main Basin management purposes

[4] Treated water deliveries from USG-6 were made in response to a request from the Main Basin Watermaster, although groundwater supplies and capacity were available. The City does not typically use USG-6 because the City's collective groundwater supplies are sufficient to meet total water demands.

TABLE 10
PROJECTED WATER SUPPLIES (SINGLE AND MULTIPLE DRY YEARS)
(ACRE-FEET)

Fiscal Year	Groundwater Supplies				Imported Water Supplies	Recycled Water Supplies	Total [1]
	Main Basin	Raymond Basin	Sub Total Groundwater	Percentage Groundwater of Total Supply	MWD		
Projected (Single Dry Year)							
2014-15	13,289	5,009	18,298	100.0%	0	0	18,298
2019-20	11,249	5,009	16,258	98.2%	0	300	16,558
2024-25	11,199	5,009	16,208	96.2%	0	644	16,852
2029-30	11,492	5,009	16,501	96.2%	0	644	17,145
2034-35	11,786	5,009	16,795	96.3%	0	644	17,439
Projected (Multiple Dry Year 1)							
2014-15	13,289	5,009	18,298	100.0%	0	0	18,298
2019-20	11,249	5,009	16,258	98.2%	0	300	16,558
2024-25	11,199	5,009	16,208	96.2%	0	644	16,852
2029-30	11,492	5,009	16,501	96.2%	0	644	17,145
2034-35	11,786	5,009	16,795	96.3%	0	644	17,439
Projected (Multiple Dry Year 2)							
2014-15	12,168	5,009	17,177	100.0%	0	0	17,177
2019-20	10,235	5,009	15,244	98.1%	0	300	15,544
2024-25	10,166	5,009	15,175	95.9%	0	644	15,819
2029-30	10,442	5,009	15,451	96.0%	0	644	16,095
2034-35	10,718	5,009	15,727	96.1%	0	644	16,371
Projected (Multiple Dry Year 3)							
2014-15	11,422	5,009	16,431	100.0%	0	0	16,431
2019-20	9,560	5,009	14,569	98.0%	0	300	14,869
2024-25	9,480	5,009	14,489	95.7%	0	644	15,133
2029-30	9,743	5,009	14,752	95.8%	0	644	15,396
2034-35	10,007	5,009	15,016	95.9%	0	644	15,660

[1] See Table 14 and Table 15 for total projected single dry and multiple dry year demands

TABLE 11
SUPPLY RELIABILITY - HISTORICAL CONDITIONS
(ACRE-FEET)

	Average/ Normal Year (2005-06)	Single Dry Year (2006-07)	Multiple Dry Years		
			Year 1 (2006-07)	Year 2 (2007-08)	Year 3 (2008-09)
City Water Production	16,785	18,668	18,668	17,524	16,763
Percent of Normal Year Supply		111.2%	111.2%	104.4%	99.9%

See Table 9 for historical production

TABLE 12
SUPPLY RELIABILITY - THREE-YEAR ESTIMATED MINIMUM
(ACRE-FEET PER YEAR)

Sources of Supply	Normal Year (2005-06) [1]	Multiple Dry Years		
		Year 2010-11 [2]	Year 2011-12 [2]	Year 2012-13 [2]
Total Supply	16,785	18,668	17,524	16,763

[1] See Table 9 (Based on year 2005-06)

[2] See Table 9 (Years 2010-11, 2011-12, and 2012-13 based on years 2006-07, 2007-08, and 2008-09, respectively)

TABLE 13
PROJECTED NORMAL WATER YEAR SUPPLY AND DEMAND COMPARISON
(ACRE-FEET)

	2014-15	2019-20	2024-25	2029-30	2034-35
Projected Normal Water Year Supply					
Total Supply [1]	16,452	14,888	15,152	15,416	15,680
Projected Normal Water Year Demand					
Demand [2]	16,452	14,888	15,152	15,416	15,680
Projected Normal Year Supply and Demand Comparison					
Difference (Supply minus Demand)	0	0	0	0	0

[1] See Table 9.
[2] See Table 8.

TABLE 14
PROJECTED SINGLE-DRY WATER YEAR SUPPLY AND DEMAND COMPARISON
(ACRE-FEET)

	2014-15	2019-20	2024-25	2029-30	2034-35
Projected Single-Dry Year Water Supply					
Total Supply [1]	18,298	16,558	16,852	17,145	17,439
Projected Single-Dry Year Water Demand					
Demand [2]	18,298	16,558	16,852	17,145	17,439
Projected Single-Dry Year Water Supply and Demand Comparison					
Difference (Supply minus Demand)	0	0	0	0	0

[1] See Table 10.
[2] Based on ratio between Normal Water Year with Single-Dry Year. See Tables 8 and 11.

TABLE 15
PROJECTED MULTIPLE-DRY YEAR WATER SUPPLY AND DEMAND COMPARISON
(ACRE-FEET)

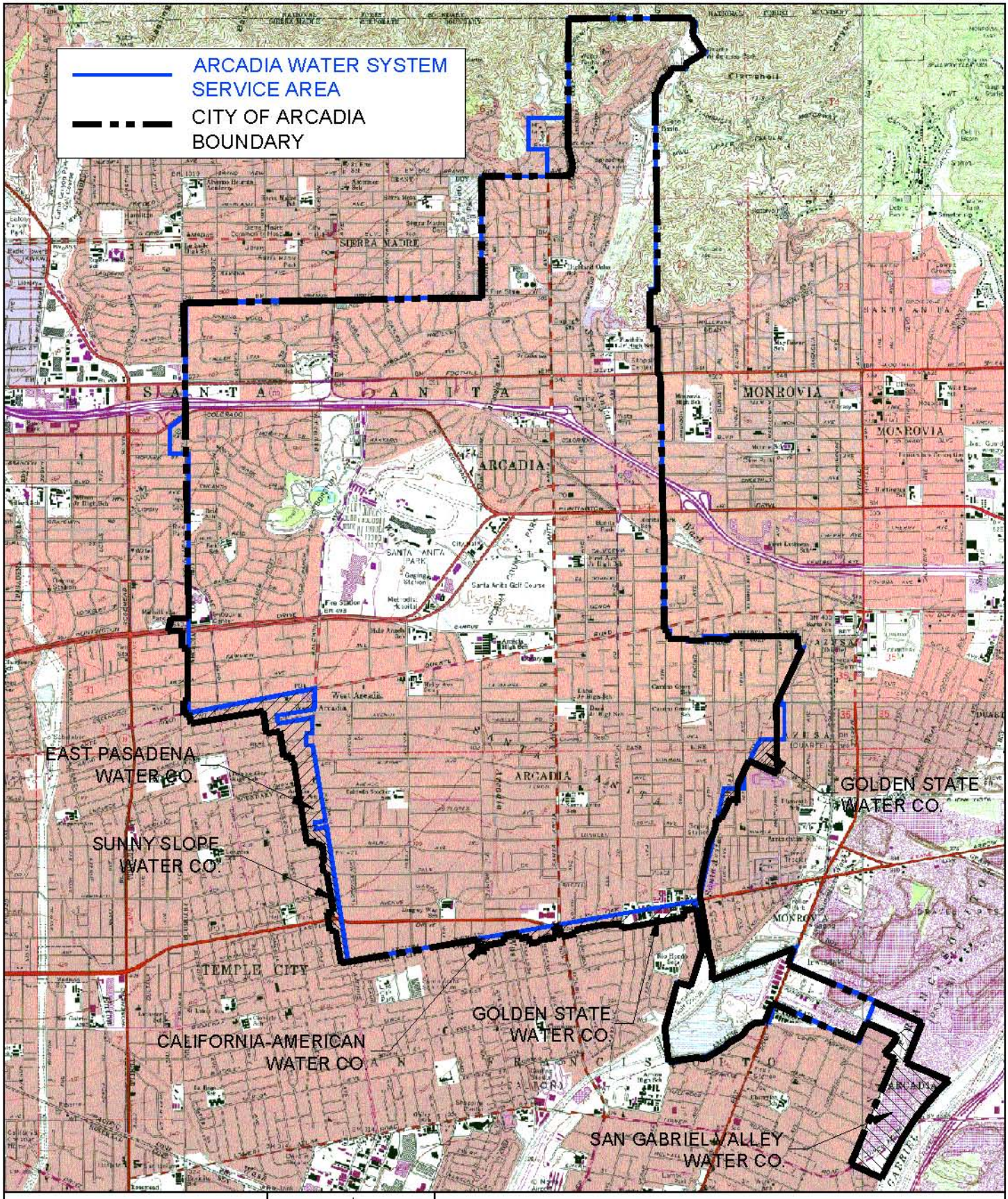
Multiple Dry Year 1	2014-15	2019-20	2024-25	2029-30	2034-35
Projected Multiple-Dry Year Water Supply					
Supply [1]	18,298	16,558	16,852	17,145	17,439
Projected Multiple-Dry Year Water Demand					
Demand [2]	18,298	16,558	16,852	17,145	17,439
Projected Multiple-Dry Year Water Supply and Demand Comparison					
Difference (Supply minus Demand)	0	0	0	0	0

Multiple Dry Year 2	2014-15	2019-20	2024-25	2029-30	2034-35
Projected Multiple-Dry Year Water Supply					
Supply [1]	17,177	15,544	15,819	16,095	16,371
Projected Multiple-Dry Year Water Demand					
Demand [2]	17,177	15,544	15,819	16,095	16,371
Projected Multiple-Dry Year Water Supply and Demand Comparison					
Difference (Supply minus Demand)	0	0	0	0	0

Multiple Dry Year 3	2014-15	2019-20	2024-25	2029-30	2034-35
Projected Multiple-Dry Year Water Supply					
Supply [1]	16,431	14,869	15,133	15,396	15,660
Projected Multiple-Dry Year Water Demand					
Demand [2]	16,431	14,869	15,133	15,396	15,660
Projected Multiple-Dry Year Water Supply and Demand Comparison					
Difference (Supply minus Demand)	0	0	0	0	0

[1] See Table 10.
[2] Based on ratio between Normal Water Year with Multiple Dry Years. See Tables 8 and 11.

PLATES



STETSON ENGINEERS INC.
881 VILLAGE OAKS DRIVE, STE. 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065
2171 E Francisco Blvd., Suite K
San Rafael California 94901
2551 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

APPROXIMATE SCALE:
2,000' 0 2,000'

CITY OF ARCADIA

LOCATION MAP

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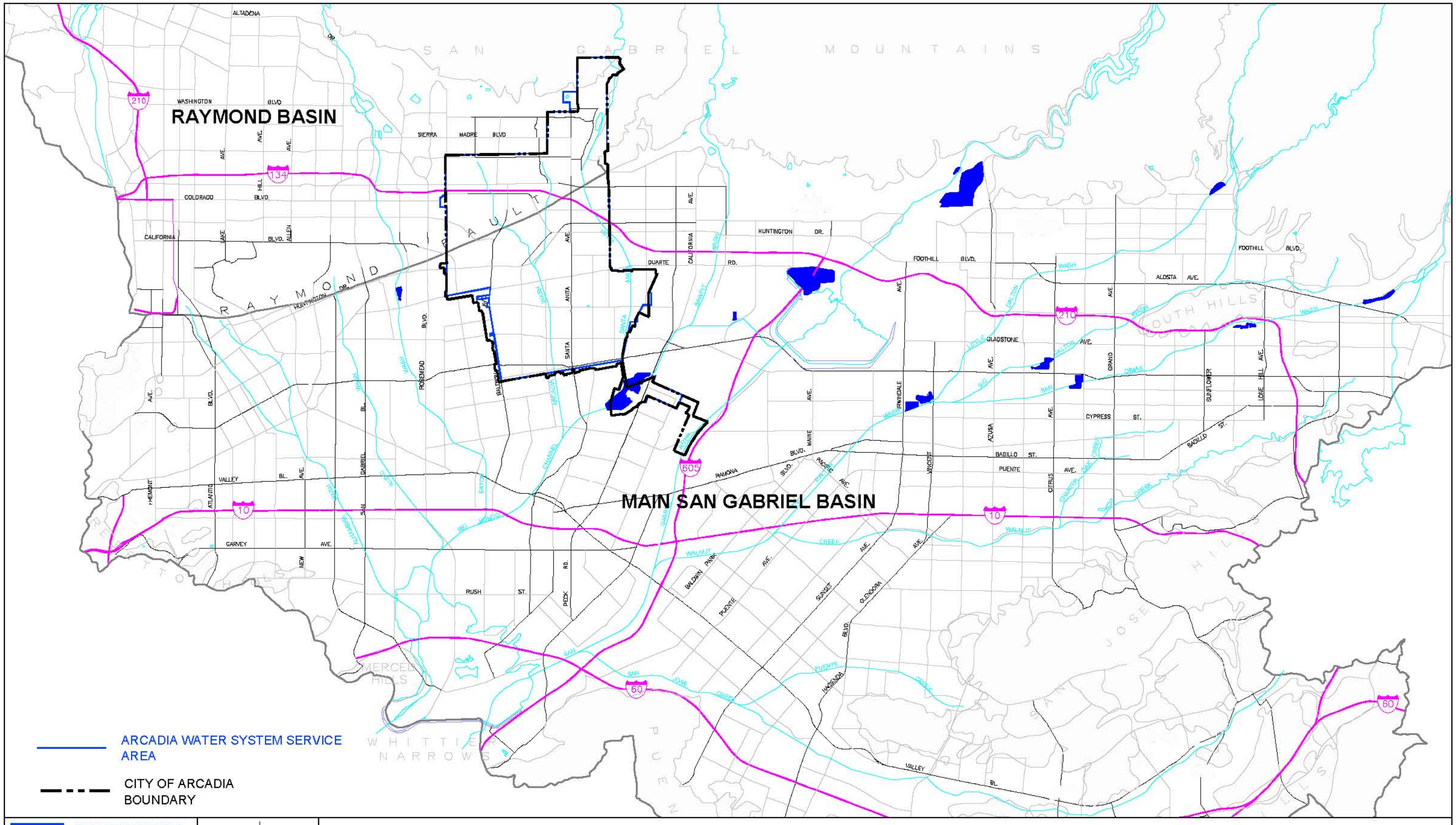

STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

APPROXIMATE SCALE:
4,000' 0 4,000'

CITY OF ARCADIA

VICINITY MAP - MAIN SAN GABRIEL BASIN AND RAYMOND BASIN

PLATE 2

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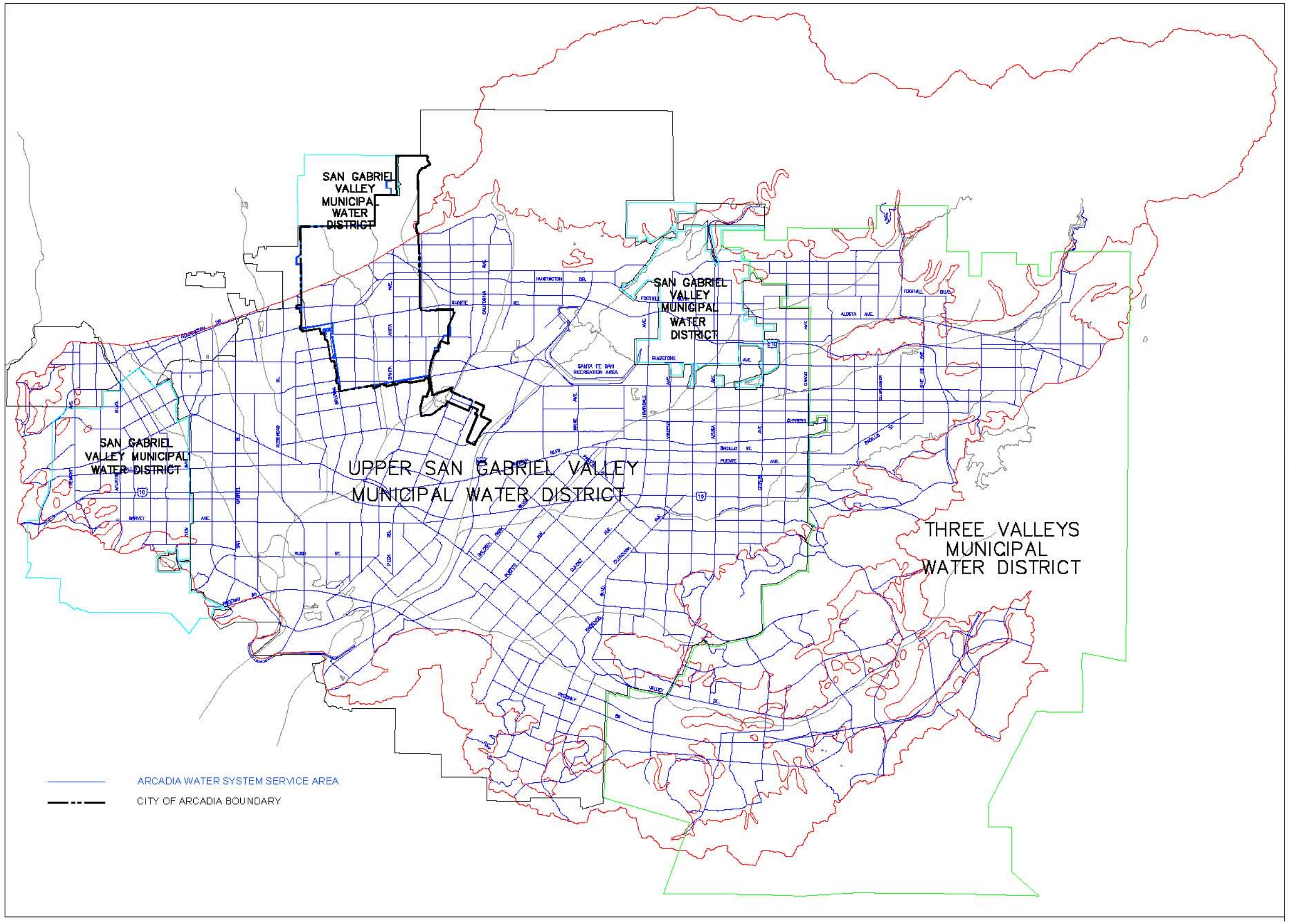

LEGEND

- UPPER SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT
- THREE VALLEYS MUNICIPAL WATER DISTRICT
- SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT
- BASIN BOUNDARY AND WATERSHED

STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

APPROXIMATE SCALE:
6,000' 0 6,000'

CITY OF ARCADIA

MUNICIPAL WATER DISTRICT BOUNDARIES

PLATE 3

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RAYMOND BASIN BOUNDARY

MONK HILL BASIN

PASADENA SUBAREA

SIERRA MADRE SPREADING GROUNDS

SANTA ANITA SPREADING GROUNDS

SANTA ANITA SUBAREA

SIERRA MADRE WASH

SANTA ANITA WASH

ALTADENA

WASHINGTON BLVD

COLORADO BLVD.

CALIFORNIA BLVD.

SIERRA MADRE BLVD

DUARTE

HUNTINGTON DR.

210

134

SAN GABRIEL MOUNTAINS

RAYMOND FAULT

STETSON ENGINEERS INC.

861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

APPROXIMATE SCALE:
2,500' 0 2,500'

CITY OF ARCADIA

RAYMOND BASIN

PLATE 4

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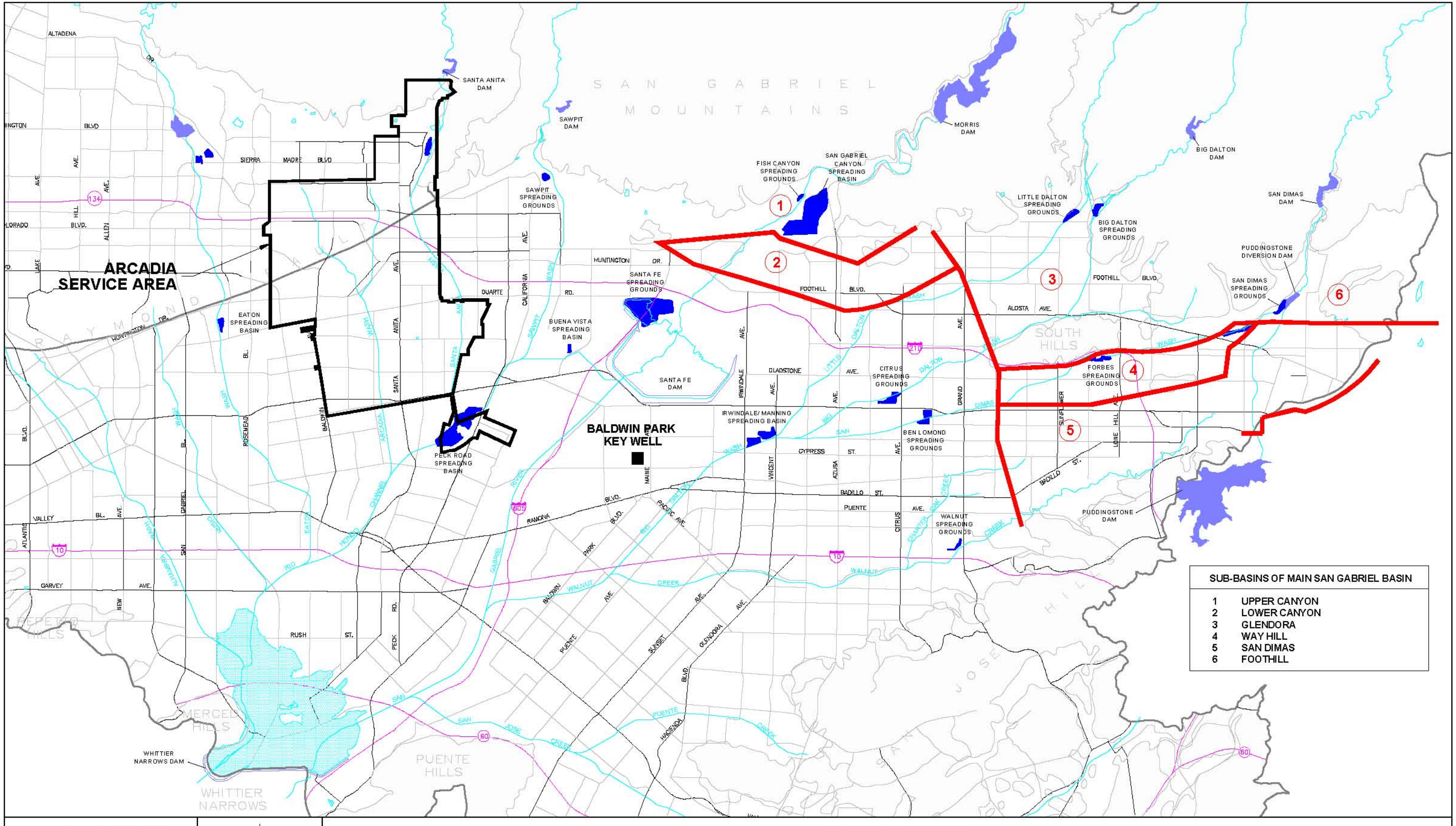

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861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

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San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

APPROXIMATE SCALE:
3,500' 0 3,500'

CITY OF ARCADIA

SAN GABRIEL VALLEY/ MAIN SAN GABRIEL BASIN

PLATE 5

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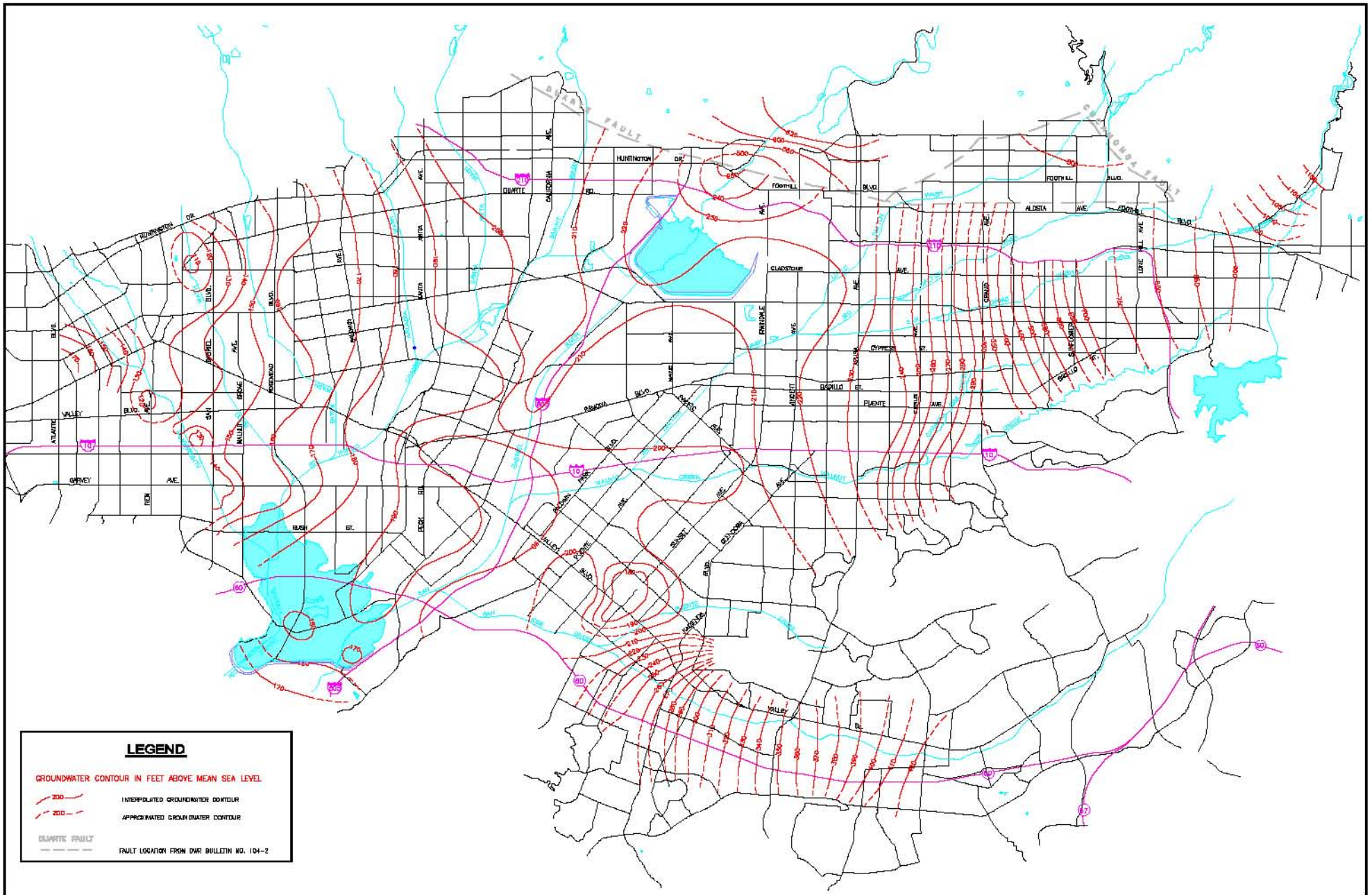

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COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
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2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

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APPROXIMATE SCALE
6,000' 0 6,000'

CITY OF ARCADIA

GROUNDWATER CONTOURS MAP FOR SAN GABRIEL BASIN - JULY 2010

PLATE 6

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